

COAL AGE

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November 25, 1926

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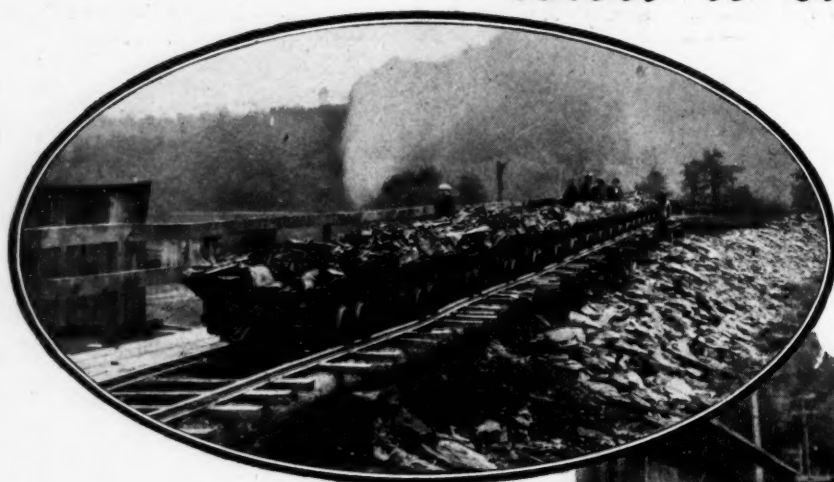
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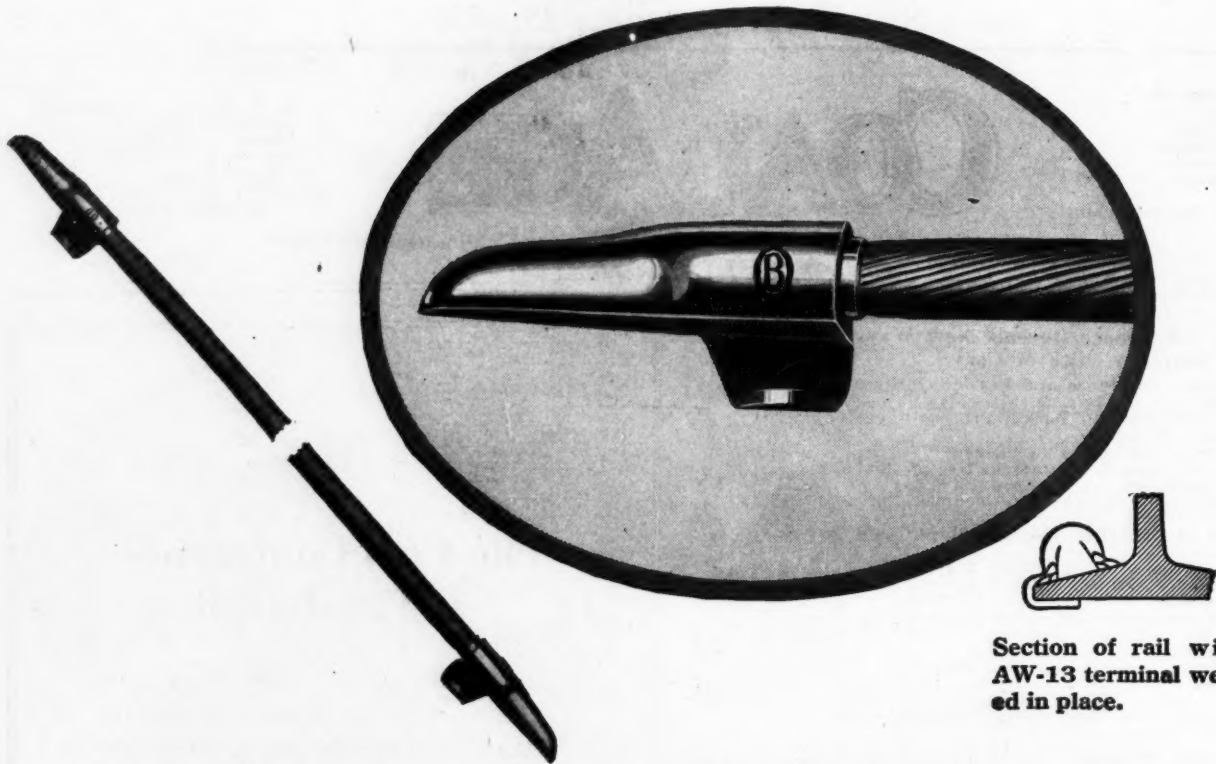
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The Coal Conference at Pittsburgh

During the greater part of last week a meeting of far more than ordinary importance was in session in the Smoky City. Here were gathered together scientists, experimenters, inventors, manufacturers, coal producers and the like to the number of approximately 1,700. It is eminently fitting that Pittsburgh, the recognized center of both the coal and steel industries, should have been chosen as the meeting point.

And these men of science and industry, these leaders in theory and its practical application, were assembled not to discuss ways and means of getting coal out of the ground but of effectively utilizing it after it has been brought to the surface. Naturally their deliberations were broad, ranging all the way from the field of the geologist on the one hand to that of the synthetical chemist upon the other. By no means all of the papers presented are of especial interest to coal men.

In order to bring this conference and its significance home to its readers *Coal Age* had no less than three editors in attendance. By this means every session could be covered and its salience conveyed to the coal producers of the land by men of their own ilk



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Devoted to the Operating, Technical and Business
Problems of the Coal-Mining Industry

R. DAWSON HALL
Engineering Editor

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And Now the Chemical Stage

PERHAPS the last general stage in the development of coal mining has been reached. The mining engineer, fifty years ago, had only meager equipment. He was blissfully ignorant of anything but mining. Then came a large mechanical development and a meager introduction of electricity. The master mechanic was added to the mine staff in recognition of the new need. But electricity fast became a study of greater complexity, with the result that the mining staff became inadequate, and electrical engineers to install and maintain this equipment were added.

A few more years and the science of business advanced. The mine management had to keep pace with the progress of accounting. Industrial relations also introduced elements into the work of the executive he had not before considered, and a new class of experts was added to the payroll.

Now the industry is slowly becoming conscious of a chemical development that taxes its mental equipment much as the other changes have done. It seems likely when coal processing becomes adopted as a part of the industry the family of mine experts will have to set seats at the official table for a chemist and a chemical engineer if not for several of them. Mining executives will be busy at nights refurbishing their too-often meager chemical knowledge to meet the new requirements, for if they do not actually qualify as experts in organic chemistry they must at least be able to understand what those who are experts are advocating and to make decisions based on their recommendations and the facts they present.

The recent International Conference on Bituminous Coal, while free from undue elaboration, or because it was free from that characteristic of most chemical discussions, will afford the coal producer an insight into what is coming.

Some schemes and methods proposed may be too elaborate for present-day financing and for the prices to be obtained for products and byproducts in the markets of 1926. But who knows what the future will show? The presentations made by the foreign delegates with the exception of Dr. Gill were not detailed enough to permit of a careful evaluation of the profits to be derived from their installations. Nevertheless it is well known that the manufacture of methyl alcohol from gas has been so successful as to drive almost out of the market the American manufacturers who have been deriving that product from wood carbonization.

Coal men will do well to look into the possibilities of the new processes which promise so much for the development of the industry. They are already in a few cases striving to adapt these changes to their advantage. The Old Ben Coal Corporation, the Consolidation Coal Co. and the Clinton Coal Co. are examples of corporations which have made something more than an effort

to take advantage of the profits which coal carbonization at low temperatures affords.

It has been clearly shown that the fertilizer industry is one which is more likely to use coal than water power. As the freight rate of fertilizer makes its transportation expensive, it is likely that it can and will be made before long, not only in the neighborhood of large steel works, but at centers in the various coal fields, from which it can be readily transported to the farms. As intensive farming increases and reliance is put on fertilizer and as the cost of producing fertilizer decreases with better technique, making its use more inviting to the farmer, it is likely that more sulphate of ammonia will be demanded.

Modern living conditions demand smokeless coal. Some one will provide it, and who is more likely to do so successfully than the coal producer, whether at the mine or nearer the market? For the coal industry the International Conference just concluded has great significance.

Hitting on All Cylinders

EVERY COAL MINE executive and engineer recognizes the desirability of keeping equipment operating at its highest mechanical efficiency. This is advantageous not only because it means dollars-and-cents savings but also because many machines cannot operate surely and safely unless they "hit on all cylinders." Thus, neither the stationary single, the two-cylinder locomotive, the ubiquitous "flivver four," the smooth automobile "six" or "eight," or the powerful "Liberty twelve," can properly do the work of which it is capable unless it makes full use of every one of its power-developing elements.

What is true of steam and gasoline engines is also true of all other mechanical equipment and processes—unless all parts function properly and in exact synchronism with each other, maximum efficiency cannot be attained. This is equally applicable to the human body, to business and to organization. For if one cog in these complicated mechanisms does not mesh properly, the efficiency of the whole will inevitably be lowered.

Regardless of whether the business in which one is engaged is a single-, a twin- or a multi-cylinder affair, it is well, occasionally, to look around for loose gears, square pegs, "missing" cylinders and broken or idle parts either human or mechanical, to eliminate these, as far as is humanly possible, and then note the "speeding up," the greater efficiency, the heightened smoothness of operation, and the increased profits that result. If this has already been done the process should be continued, for all parts—both human and mechanical—break or wear out and need repair or replacement. Furthermore, new developments, improvements and inventions are constantly being made which it may be advantageous to adopt.

Only by removing the "dirt and carbon" at frequent intervals, and by "keeping everlastingly at it," can industry keep "hitting on all cylinders." while no organization can ever hope to reach an efficiency of 100 per cent it can, through concerted effort and co-operation, approach more or less closely to this desired goal. The coal industry, among others, offers ample opportunity for periodic overhauling and improvement.

What Standards?

J. B. PAULEY, in an address before the Illinois Mining Institute recently, said that Midwestern operators should measure coal-mine efficiency by the standards of more efficient industries rather than rest upon laurels already won as the most efficient coal producers in the world. There can be no more effective way to reach the standards of efficiency attained by other industries than to adopt the methods that they have found to be successful.

The nearer a coal mine comes to complete mechanization the nearer it approaches factory conditions, and the more applicable to the coal industry becomes scientific management. For certainly the automotive industry, the pride of the industrial world, owes its efficiency to scientific management. Centralized production control to plan, schedule and dispatch; standardized conditions, equipment and performance, adequate and prompt supervision for production and quality, and standardized costs by budgeting expenses against expected income, are some of the management methods of this industry. These are the means by which it has attained its present degree of efficiency. It had no traditions—it established its own code of practices, and it set its standards high.

Let us have courage to investigate better mining methods, to investigate better management methods, for more efficient utilization of invested capital and for more effective labor performance. Increased prosperity, for the employer and employee, will be the result.

This is what scientific management did for the automotive industry and it offers the same possibilities for the coal industry. The problem of better management, which is the problem of greater efficiency, can be worked out by the exercise of the same courage and initiative that characterized the growth of better mining and mechanical methods in Illinois.

Will They Never Learn?

IN SPITE OF safety and educational campaigns an appallingly large number of fatal accidents resulting from the careless and improper handling of mine and quarry explosives still occur. Manufacturers of powder and dynamite have, for years, published booklets and issued bulletins setting forth in detail the proper methods of using their product and the dangers attendant upon carelessness. Mine and quarry operators have issued imposing lists of "don'ts" to their powdermen, shotfirers and other employees who have occasion to handle explosives. In many instances these cautions and warnings are prominently displayed upon the walls of the building or magazine where the blasting material is stored as well as near the places where it is used.

Despite these warnings, the high fatality rate among the users of explosives furnishes positive proof that "familiarity breeds contempt." Crimping of caps with

the teeth, thawing of frozen dynamite on or in fires, smoking near open powder kegs—these are but a few of the dangerously, and often disastrously, foolish procedures that are daily practiced. A new example of carelessness or thoughtlessness, with its fatal results, is contained in a recent report from a quarry in Vermont. It appears that a workman, when a charge of dynamite failed to explode, dug it up and soaked the fuse in gasoline. Replacing the charge, he lit the fuse and, of course, was blown to pieces.

This should serve as another warning that explosives are dangerous substances that must be handled with all due respect and care. But how long will it be before we again read the news heading "Crimps Dynamite Cap With Teeth; Funeral Tomorrow," or some equally pathetic evidence of the cost of carelessness?

Merging the Systems

AT A CERTAIN GASSY MINE in Alabama two doormen are employed. One comes on duty at the end of the day shift and is relieved about midnight by the other, who stays until the miners come to work in the morning. The duty of a doorman is to make rounds of inspection of all doors to see that they are closed. If one is found open, the mine officials are notified immediately.

This employment of doormen is in keeping with a logical conclusion that the first and most important consideration is to prevent the accumulation of an explosive mixture of gas and air.

But even with these precautions it is possible for a door to remain open during the time required to make a round. Why are not more electric signal or indicating systems used on mine doors? Electricity is practically an instantaneous messenger, and nowadays almost anything in the form of transmission of intelligence can be accomplished by it as an agent.

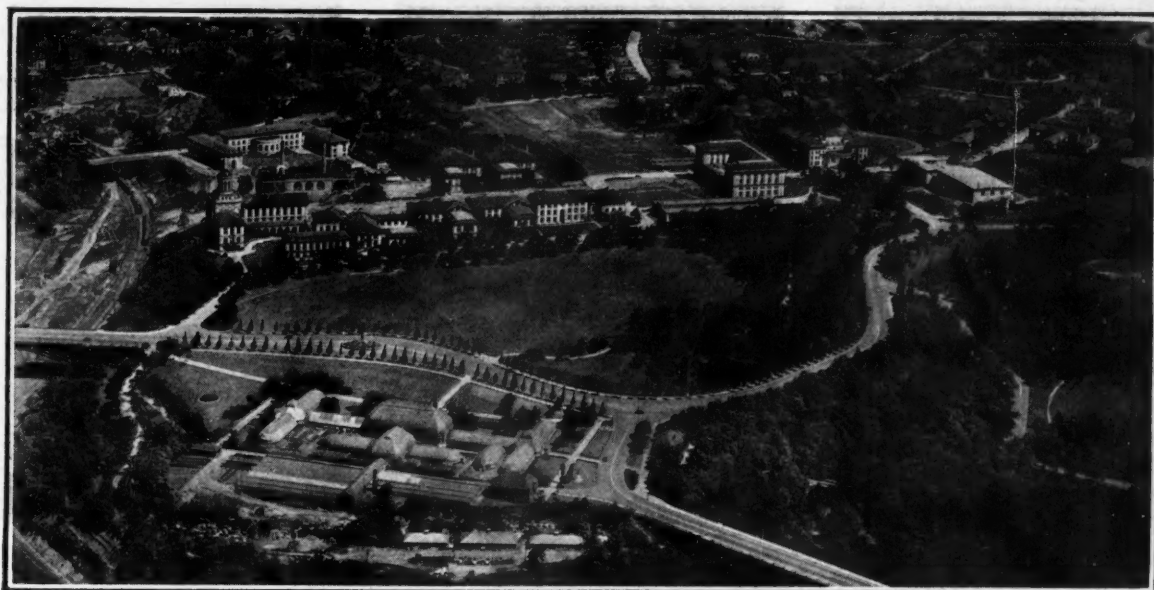
First cost and the difficulties of maintaining uninterrupted signal lines probably are the chief reasons for the lack of door-indicating systems. The larger companies, however, have shown a disposition not to stop at first cost where safety is concerned; therefore the circuit-maintenance difficulty probably is the determining factor.

Excessive water and bad roof are the principal enemies of underground wiring, but these have not prevented the use of telephones in mines thus affected. In some cases the telephone conductors are carried in a sheathed cable buried in concrete.

The conductors of a door position-indicating system could be installed in the same manner, and throughout much of the distance could be contained in the same cable as the telephone lines. Forethought in regard to this arrangement would materially cheapen the installation cost of a door-indicating system and make it immune from damage by water or from falls of roof.

Economics of Labor-Saving Machinery

SUPPOSE THAT, at a mine producing 1,000 tons per day, a machine is installed that will save the labor of one man; the company saves \$6 per day and the output may go to 1,006 tons because the man, thus released, has the opportunity to load 6 tons of coal. The company saves money; yet the man's earnings are maintained because he has been transferred to more productive work. Everybody benefits.



International Conference Reveals New Ways of Unlocking Stored Wealth of Coal

Bergius Gets Three Barrels of Oil from Ton of Coal—Methyl Alcohol and Gasoline Substitutes Derived from Coal Gasification—Ash by Catalytic Action Affects Coke, Gas and Tar Yields

Staff Correspondence

PROCESSING of coal received a definite impetus from the International Coal Conference on Bituminous Coal held Nov. 15-18 under the auspices of the Carnegie Institute of Technology at Pittsburgh, Pa. The meeting had been carefully planned by Dr. Thomas S. Baker, president of Carnegie Institute, who made a special trip to Europe to obtain the co-operation of the leading European authorities on this subject. Gratifying indeed was the attendance, exceeding all anticipations. Over 1,700 persons registered, and all the meetings were well attended. The main meetings were held in the spacious Carnegie Music Hall. When sections met the sessions were held in the various auditoriums of the Carnegie Institute of Technology—the Union, the Faculty Club Room and Room No. 104 of the Industries Building. Interest in coal carbonization processes was widespread. The coal operator wanted to know if he could process his coal before selling it; the public utilities, large users of coal, were anxious to discover if they could get a fuel virtually free of cost or

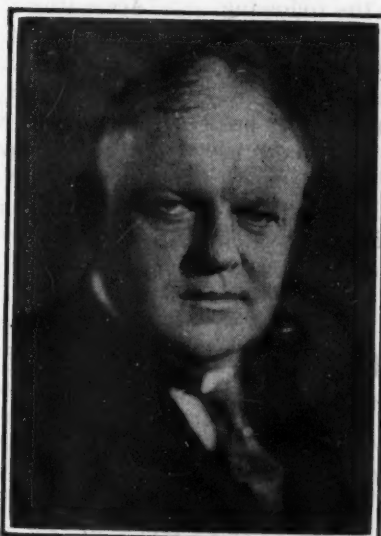
at a lower price by buying raw coal and processing it so as to pay all or a part of the cost from the byproducts; the gas men were looking for more economical ways of making gas, the dye men, the fertilizer manufacturers

and the explosives chemists were looking for new sources for their basal chemicals. Consequently the interest was not confined to any one group.

Among the principal speakers were Dr. Friedrich Bergius and Prof. Franz Fischer. The first has devised a method whereby under pressures of one hundred to two hundred atmospheres and temperatures of from 400 to 500 deg. C., coal is combined with hydrogen so as to produce a quantity of benzol equal to 15 per cent of the quantity of coal treated, Diesel oil and creosote also equal to 15 per cent, fuel oil equal to 20 per cent and gas equal to another 20 per cent. Consequently half the coal is turned into oil and one-fifth into gas.

Professor Fischer described the results of his experiments in the synthesis, from the products of water gas, of various compounds and mixtures, including methyl alcohol, petroleum, synthine, synthol and gasline. This work was performed at atmospheric pressure and at relatively low temperature with the aid of catalysts.

General Georges Patart, consulting engineer, Paris,



Dr. Thomas S. Baker

The headpiece accompanying this article is an airplane view showing a portion of Schenley Park with the Carnegie Institute of Technology and the Bureau of Mines buildings in the background. It was here that the various meetings of the Coal Conference were held.



Dr. C. H. Lander



A. C. Fieldner



Dr. Friedrich Bergius

France, discussed the various synthetic processes by which elements and simple compounds could be converted into more complex bodies with the aid of catalysts. Dr. Cecil H. Lander described the British experimentation in low-temperature carbonization, and Dr. R. Lessing the effect of small quantities of pure earthy materials on the quantity of coke, gas and tar yielded by coal on carbonizing, describing their action as either catalytic or anti-catalytic. Geoffrey M. Gill, British authority on gas making, Jean Bing, director of the Technical Service of the Coal-Tar Producers and Distillers Association, of France and Dr. Yoshikiyo Oshima, director of Japan's Imperial Fuel Research Institute, added the results of their valuable inquiries into similar problems.

To these authorities were added a number of American experts too numerous to mention who gave detailed information as to their processes and experiences. The review of the various sessions contained in the following pages will give the reader the more striking details of the conference. It is likely that, owing to the success of this congress and the interest evinced, it may be repeated year by year. Many of those present hoped that the Carnegie Institute of Technology would be donated a fund that would permit of the establishment of a technical laboratory such as would enable it to conduct research into these fertile fields of inquiry which are of much interest to the United States as the world's largest coal producer and consumer.

Baker Opens Conference and Lander Outlines British Research

Dr. Thomas S. Baker, president of the Carnegie Institute of Technology, Pittsburgh, Pa., who conceived and helped to plan the International Conference on Bituminous Coal, delivered the opening address at the first session on Monday morning, Nov. 15. He stated in part: "This conference is, in a true sense, an international meeting. For there are scientific men present from more than a dozen countries, who have come together for the interchange of their views and ideas. It is the first international conference, as far as I know, that has dealt wholly with the subject of coal. There

can be no doubt about the importance of the subject that we shall here consider, for coal will remain the chief source of energy for generations.

"Many of our great industries owe their origin, life and prosperity to the discoveries made in the research laboratory. The coal producer has, thus far, profited but little from the investigations of the scientist. However, the presence here of this large number of men who are interested in the mining and sale of coal leads to the conclusion that they too feel that they should have a share in the advantages to be secured from research."

Following Dr. Baker, Marius R. Campbell, senior geologist of the U. S. Geological Survey, addressed the delegates on "Our Coal Supply: Its Quantity, Quality and Distribution." He said:

LOW-GRADE COALS MUST BE UTILIZED

"According to the data submitted to the Twelfth International Geological Congress at Ottawa, Canada, in 1913, the United States contains more than half—fifty-two per cent to be exact—of the entire coal supply of the world. Of the forty-eight states of the Union, twenty-eight, as well as the territory of Alaska and the Philippine Islands, have a plentiful supply of coal; eight states have only a small amount in each, and twelve together with the Hawaiian Islands have absolutely no known supplies of coal."

"Possession of an almost unlimited supply of coal has made both operators and users wasteful. As a result thousands, if not millions, of tons of the best fuel in the country have been burned under such conditions that there has been no economic return or, through wasteful methods of mining, have been lost beyond recovery. Much of this waste was due to the fact that coal was plentiful and cheap. It also resulted from the fact that few persons had the vision to see that our coal supply, though large, was limited, and that sooner or later it would be exhausted. For these and other economic reasons we must come to the use of low-grade coals sooner than would otherwise have been the case.

"As near as can be estimated, the original coal resources of the United States were 3,444 billion tons. Of this amount sixteen billion tons have been used and

eight billion tons wasted, leaving a present reserve of 3,419 billion tons."

The second speaker of the session was Dr. Cecil H. Lander, Director of Fuel Research of the Department of Scientific and Industrial Research, London, England, who presented a paper entitled "British Research on Fuel Utilization."

"In England," said Dr. Lander, "the study of coal has followed two lines of inquiry: First, a physical and chemical survey and classification of the coal beds in the various districts, and, second, an investigation of the practical problems that must be solved if any large proportion of the raw material at present burned in its natural state is to be replaced by the various forms of fuel obtainable from coal by carbonization and gasification processes. These lines of inquiry are not independent, as a study of the raw material is essential for its proper utilization."

"Standardization of methods of sampling and analysis is most important. In England there is at present singularly little information available as to the true constitution of our coals and the detailed characteristics of the various beds as they occur in the ground. It has been the work of the Fuel Research Division to analyze, chemically and physically, columnar samples of our coals from the floor to the roof and, from this data, to determine the best use that can be made of each coal. We hope for international standards with reference to the sampling, testing and specification of coal."

The discussion of these papers was led by Samuel A. Taylor, president of the American Institute of Mining and Metallurgical Engineers. In the course of his remarks Mr. Taylor said: "In 1876 it was stated that the known coal supply of that time would last only one hundred years. Not long ago a geologist of the Colorado Fuel & Iron Co. asserted that there was enough coal in Colorado alone to supply the entire United States for one hundred years at the present rate of consumption. Although the consumption of coal doubled every ten years between 1850 and 1910, its use has not increased at that rate since that time. This 'flattening' of the consumption curve can be attributed, in a large measure, to the savings effected in coal consump-

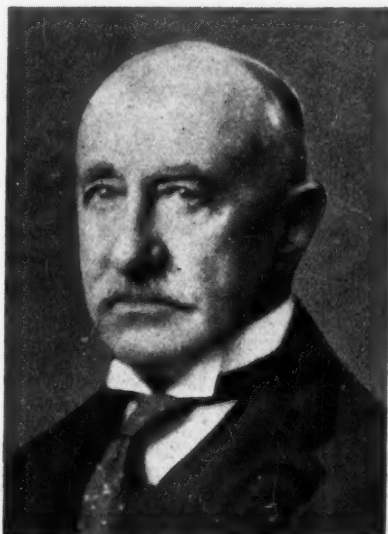
tion. Allowing 3½ bbl. of oil to a ton of coal, oil in 1925 had replaced 200,000,000 tons of coal. In the same year, 100,000,000 tons had been saved annually through utilization of coal at higher efficiencies. Fifty million tons had been saved in byproduct ovens, and 30,000,000 tons were saved by the railroads, making a total yearly saving of 380,000,000 tons of coal."

Value of Research and Bergin Process Are Monday Afternoon Themes

A new era has dawned in the use of coal. It will be characterized by experimentation and commercial development of ever-increasing intensity in the utilization of this highly important fuel. This was the opinion expressed in a paper on the "Practical Value of Fundamental Research on Coal," presented before the International Conference on Bituminous Coal by A. C. Fieldner, chief chemist of the U. S. Bureau of Mines. A realization of the inevitable depletion of petroleum and natural gas has "directed attention to the need for augmenting and eventually replacing these fuels with products derived from coal." Mr. Fieldner's paper opened the Monday afternoon session which attracted an attendance of about one thousand.

He said that the determination of fundamental laws and facts by scientific research will promote rapid progress in industrial research and, in consequence, will eliminate much of the effort otherwise demanded for the solution of industrial problems. Many other industries have already seen the value of fundamental research in the solution of their difficulties. The coal industry likewise should make systematic investigations and should co-ordinate its findings into laws and principles relating to the behavior and treatment of coal.

Mr. Fieldner suggested the inconsistency of the government in appropriating approximately \$127,000,000 annually for the support of the Department of Agriculture, which deals primarily with food and clothing supplies, while allowing the Bureau of Mines only \$2,000,000. Of this appropriation, the Bureau is restricted to \$154,000 for fuel testing and only a small portion of this amount can be devoted to fundamental research.



John Hays Hammond



Dr. Edwin E. Slosson



Dr. R. Lessing

Within the last year the petroleum industry started a program of purely scientific study into the origin and nature of its product. The American Petroleum Institute will spend \$100,000 this year and as much during each of the four succeeding years in the support of research fellowships, with assurance that further funds will be available for a continuation of the work. He would like to see at least as much interest taken in the systematic study of coal.

In a paper on the "Transformation of Coal into Oil by Means of Hydrogen," Dr. Friedrich Bergius, of Heidelberg, Germany, described his scheme, known as the Bergin process, for the direct liquefaction of coal by hydrogenation. He is firm in the belief that the only raw material that can be used in an industrial process for the manufacture of artificial substitutes for oil is coal or a similar carbonaceous substance. Although most of his paper was devoted to the technique of his own process, it also expressed his opinion of other means of making oil from coal. Although some of the processes of low-volatile distillation other than his own are practicable so far as their yield of a special kind of coke and low-temperature tar is concerned, the oil which they produce is merely a byproduct of small quantity.

He asserts that the economy of manufacture of motor fuel by synthetic derivation from coal products is uncertain. In this process coal is first transformed into coke and the latter into carbon monoxide, with which specially manufactured elementary hydrogen is made to react. In the transformation of coke to carbon monoxide hydrogen is separated from the carbon and replaced by oxygen. In a subsequent step the reaction is reversed, with the further complication that a surplus of elementary hydrogen must be added to combine with the oxygen in order to separate it from the carbon. The expense of generating free hydrogen is such as to make desirable the conservation of the original hydrogen content of the coal. The Bergin process conserves this hydrogen.

In this process the coal is ground to 2 mm. or less in size and is mixed with the heavy portion of the oil derived from the process itself. This pasty material is forced into a high-pressure vessel, where it is heated,

together with the oil already contained therein, to reaction temperature. Hydrogen is introduced at the same end as the coal and oil. The products are withdrawn and the gas is separated from the liquid and solid material after all have been cooled and the pressure reduced. For best results a pressure of 200 atmospheres is needed. More information concerning this process will appear in a later issue of this magazine.

A net ton of coal will yield by this process about 50 per cent of oil by weight or 132 gallons. On another basis this quantity of bituminous coal yields about 45 gallons of gasoline which has non-knocking properties similar to those of a mixture of benzol and gasoline when used as a motor fuel. Good lubricants can be derived from the oil produced by this process. Construction has already been commenced on two plants designed to have a joint capacity of a million barrels of oil products a year, based on this process.

From his observations of industrial problems in this country during a stay of about six weeks, Dr. Bergius hazarded the guess that the cost here of producing one ton of finished products, exclusive of the cost of coal, would be 40 to 45 marks or roughly \$10 to \$11.25 in our money.

Need for Study of Ash Emphasized

Dr. R. Lessing, consulting engineer of London, England, presented to the United States on the occasion of this conference a number of valuable suggestions as well as fundamental theories and facts relating to impurities in coal. These should aid in a better understanding of the nature and distribution of such matter as it exists in the coal both when in the solid and the loose state. His views were expressed in a paper on "Coal and Its Mineral Matter," delivered at the general session on Tuesday morning, at which John Hays Hammond presided.

He emphasized the necessity for devoting more attention to the study of ash-forming matter than has been the case in the past because the ash affects *utilization* as well as the processes of combustion. Dividing coal into four substances in accordance with the English classification—namely, fusain, clarain, vitrain and



E. M. Herr



Walter E. Trent



Geoffrey M. Gill



John M. Weiss



Prof. Franz Fischer



W. H. Fulweiler

durain—in a study of the distribution of ash, the fact is revealed that the four ingredients vary widely in the degree and nature of impurity. Unlike that in the three other ingredients, the ash in durain is of argillaceous character and about three-fourths of it is insoluble in hydrochloric acid. On the other hand, the ash in clarain and vitrain is largely soluble in water. These facts, incidentally, illustrate the value and even practicability in some cases of fundamental research, by explaining why difficulty is experienced in washing certain coals by ordinary methods, particularly bone coal which is high in durain. He stressed the economy of cleaning coal and the importance of ash composition in its utilization. An abstract of this paper will appear in a coming issue.

MUST KEEP BELOW CRITICAL TEMPERATURE

Dr. Lessing was asked by F. C. Greene, of the Old Ben Coal Corp., to give an analysis of the difficulty which he had been having with clinkering action when carbonizing slack of a certain coal by a low-temperature process. When the temperature is maintained at the customary level, clinkers were formed. This particular difficulty was avoided when the temperature was maintained at a lower level. Dr. Lessing replied that the question resolved itself into a consideration of the distribution of the ash in the coal, at least as one of the big factors. If the ash is in close proximity to iron and sulphur compounds, a fluxing action takes place unless the heat is kept below the critical temperature.

Dr. Hugh S. Taylor, professor of chemistry at Princeton University, remarked that careful consideration should be given to the function of catalysts in the processing of coal, insisting that these act, when present, in hydrogenation. Dr. Bergius corrected the impression gained by a number of men who heard him speak on Monday, to the effect that he assumed that no catalytic action takes place in hydrogenation. He defended himself quite emphatically with the remark, "Most certainly it does." He added that liquids as well as solids may act as catalysts; also that ash may play the part of a catalyst.

Dr. E. Sinkinson, of Lehigh University, asked Dr. Lessing at what temperature does ash in coal act as a

catalyst if it thus acts at all; if so, is the action confined to the surface; also whether sulphur poisoned a catalyst. Dr. Lessing did not answer the first question but said it was of great importance and requires study. As to the poisoning effect of sulphur on a catalyst, he replied that some materials promoted and others retarded chemical action.

Improvements and Economies in Use of Coal for Power Purposes Discussed

A single session was devoted to modern developments in the production of power. It was held in the afternoon of Nov. 16 in the Industries Building of the Carnegie Institute of Technology. E. M. Herr of the Westinghouse Electric & Manufacturing Co. presided. Walter E. Trent, president, the Trent Process Co., New York, described the origin of the efforts he had been making to convert natural coal into a fuel clean of all but the vegetal-ash constituents.

During the war Mr. Trent made certain proposals to the Inventions Section of the U. S. Army embodying the following: (1) Means whereby fuels of the widest possible range could be burned under pressure in a closed container or generator (2) means whereby the products of combustion could be reduced in temperature by the addition of air or steam to such a point that they could be used in a reciprocating steam engine or prime mover of similar type, (3) the development of an engine which would combine a compression unit and a power unit to supply air and expand the products of combustion for the generation of power and (4) means for utilizing the jacket and exhaust heat to raise the temperature of the water or to produce steam for mixing with the products of combustion.

In the development of this work it was soon found that the ash accumulation was such as to render the use of the process for more than a short time impossible. This induced Mr. Trent to make a number of experiments in the pulverization and amalgamation of coal.

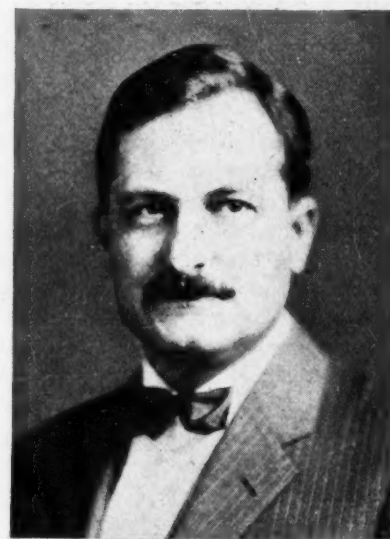
Mr. Trent said that the hammer mill makes an ideal size ($\frac{1}{4}$ in. and finer) to feed standard tumbling-barrel types of pulverizers, containing rods or balls, used for



H. A. Brassert



Louis C. Jones



Harry A. Curtis

200-mesh pulverizing. He declared, however, that all such mills are better suited to make a product of minus 20-mesh than to make one of minus 200-mesh or finer. For this purpose an electric vibratory pulverizer has been devised in which the pulverizing elements are smaller than in a rod or ball mill and are vibrated vertically instead of cascaded in a barrel. The vertical vibration is 60 times per second; its amplitude varies, but it is ordinarily $\frac{1}{8}$ in. The container is fastened to a floor resting on rubber pads and to the underside of the floor is fastened an electric vibrator. This mechanism will make 200-, 300-, 500- or even 1,000-mesh material.

Because anthracite is hard, its pulverization is both slow and difficult, and because of the density of the particles and their lack of hydrogen they should be pulverized to a greater degree than those of bituminous coal. Anthracites when reduced to 300-mesh with comparable percentages of smaller sizes burn as freely as bituminous coal at 200-mesh.

FINE GRINDING FOR LOCOMOTIVE USE

With finer grinding of bituminous coal it will be possible to use shorter fireboxes and furnaces. With coal 300-mesh or finer, they need be neither higher nor longer than those needed to burn oil. This shortening of fireboxes and furnaces will make it possible to adapt pulverized coal to locomotives and steamships.

Mr. Trent asserted that when coal was pulverized to a fine mesh it could be made to flow and seek its own level. The mere heating of pulverized bituminous coal to a point at which vapors are generated (either chemical water or hydrocarbons) gives to the coal a state of mobility, such that it follows the law of liquids. When it becomes possible to treat coal as a liquid instead of a solid, the coal industry and technique will undergo a change. Extraneous air should not be commingled with the coal dust; even that which ordinarily occupies the spaces between particles should be excluded. The best way to exclude such air would be to heat the coal till the vapors it emits displace the air by which each particle is surrounded.

That coking coals would tend to agglomerate and thus interfere with the process, Mr. Trent admitted, but

there were two ways of utilizing coking coals in a flowing retort; one of which is the preheating and agitation of the pulverized coking coal in the presence of air. The second way is by heating slowly a gently moving stream of coking-coal powder (so that complete devolatilization occurs at every stage of the gradually increasing temperature) and by compelling the expelled vapors to travel with and pass around the slowly moving particles. In these ways agglomeration is prevented.

Mr. Trent described a retort which he had devised acting on these principles. He declared that it offered high thermal efficiency because radiation from the retort was almost entirely prevented and because certain important percentages of the sensible heat of the carbonized particles as well as the heat of distillation were returned to the incoming coal.

The steel tubes should be, he said, chromium-plated inside and out to prevent carbon from reacting with the steel. By preventing the corrosion of the steel, a smooth frictionless surface would be afforded.

With coals having 35 per cent or more of volatile matter, the coal can be made to travel in a gas-like form, the vapors entraining and carrying minute carbonized particles. So long as this vaporous mass is not permitted to cool and undergo partial condensation, it answers the laws of gases. It will contain more heat units per cubic foot than the richest natural gas. It is adaptable to internal combustion for the generation of power and will be, for all practical purposes, vaporized coal.

Mr. Trent declared that coals that are to be burned in suspension should be de-ashed to avoid the discharge of dust into the atmosphere, which dust is already causing trouble. He then described the manufacture of amalgam and super fuel which products have been discussed at length in *Coal Age*. The amalgamating process, he added, is about to be applied to make a liquefied amalgam by first pulverizing the coal to much finer sizes than the ordinary 200-mesh. Amalgams made with coal pulverized finer than 350-mesh will take oil and retain it in equal weights with the coal. The product will be a liquid emulsoid and can be pumped and handled like ordinary fuel oils. It could be used for steam raising or for cracking into motor fuels.

Henry Kreisinger, formerly of the U. S. Bureau of Mines, and now with the International Combustion Engineering Corporation, New York City, described recent developments in furnaces designed for the burning of pulverized coal. He said that it became necessary to design large furnaces in order that the gases should not impinge on the environing walls. But as the size of the furnaces increased in width and in height they had to be made strong so that they would not collapse before the walls were eroded. Consequently it has become general practice to cool the walls with steam or water. Thus, as it were, the boiler was built around the furnace.

He showed by means of lantern slides a boiler where the rear wall was cooled by pipes for reheating steam, the tubes being provided with fins of steel to increase their capacity for absorbing radiant heat. The side walls in this boiler were lined with pipes for superheating steam. The bottom and front walls had water screens. Every effort had been made to increase the turbulence in the boiler furnace because this speeds up combustion.

In the discussion it was stated that water and steam piping made it unnecessary to use the higher refractories. Mr. Kreisinger said that as low an intensity as 10,000 to 12,000 B.t.u. per cubic foot of space was adequate to provide for complete combustion but, with higher rates such as 40,000 B.t.u. per cubic foot, the zone of combustion could be greatly reduced.

WHY UTILITIES BUILD CITY PLANTS

George A. Orrok, consulting engineer, New York City, presented the argument against the placing of plants, for the generation of power, at the mine mouth which, as he said, publicists have advocated. He said that the average large mine produced only 2,000 to 4,000 tons per day which would not be adequate for the biggest type of station. The water needed would be between 500 to 1,000 tons for each ton of coal burned if the greatest possible economy were to be attained.

It was necessary that a plant on which industry and the small consumer depended should be able to draw its supplies from a wide area because otherwise should there be a coal strike the supply of energy might fail.

Certain and adequate sources of power were essential with public-utility service.

According to Colonel Kelly, said Mr. Orrok, the cost of transmitting power 100 miles was 1.5 mils and 300 miles, 3 mils. Cooling towers or cooling ponds would have to be provided at most mine plants as sufficient water would not be available to do the work without them. Cooling towers were more economical than ponds but their installation had not been as general in this country as in Europe. Colonel Kelly had said that 200 miles was the maximum distance over which it would pay to transmit power in order to avoid the shipment of coal. Mr. Orrok would be disposed to make that distance far less.

NEAR BOTH GOOD WATER AND MUCH COAL

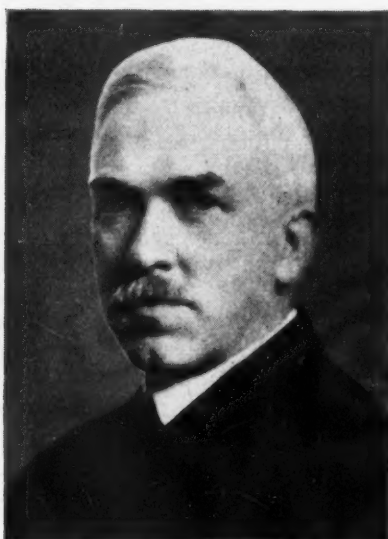
Some plants located near the coal fields might be able to draw coal from a large area. Thus the Cahokia power station was only twenty miles from three coal-producing fields. It was located at a point where water in abundant quantity was available. It must be remembered that a plant not at the mine mouth but a few miles therefrom had to pay for the terminal charges of coal transportation by railroad and these were the same as for a long distance. The location of each generating station is not, he said, a problem to be met by a simple formula. Each case must be studied by itself.

F. P. Coffin, research laboratory, General Electric Co., Schenectady, N. Y., discussed "The Relation of Thermal Storage in Boilers and Furnaces to Fuel Application" and indicated the heat available under different boiler conditions. The lack of this heat delayed a boiler from giving the output desired when increased service was demanded of it and caused it to continue that output after the need for it had ceased.

In the absence of Fred R. Low, editor of *Power*, New York City, C. H. Berry, of the same publication, led the discussion saying that the average efficiency of boiler plants is below 60 per cent. It seemed possible that an efficiency of 70 to 75 per cent could be sustained at industrial operations. The public utilities were able to attain efficiencies of 75 to 80 per cent. Even if an average efficiency of only 75 per cent were attained in industrial plants 60,000,000 tons of coal



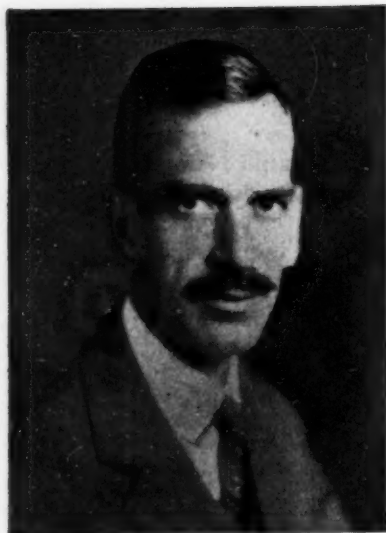
Scott Turner



O. P. Hood



S. W. Parr



C. V. McIntire,
who has been carbon-
izing coal at Fairmont,
W. Va., for the Consol-
idation Coal Products
Co.

could be saved annually. This would be of great value with our decreasing coal supplies. Moreover it would release much labor for other industrial purposes.

Professor W. Trinks said that for every pound of coal, 10 lb. of steam could be raised, but the water consumption for all purposes would be 500 lb., if proper condensation was afforded. He desired to supplement what Mr. Orrok had said by drawing attention to the unsuitability of the water at mines for the needs of the power station.

High-Temperature Processing Occupies Important Place in Fuel Category

"High-temperature processing of coal holds an important position in this country at the present time because about 10 per cent of our annual output is converted into coke and other derivatives in byproduct ovens," remarked W. L. Affelder, assistant to the president of the Hillman Coal & Coke Co., who, as chairman, opened the Tuesday afternoon meeting of the high-temperature distillation section. Jean Bing, director of the Technical Service of the Coal Tar Producers and Distillers' Association of Paris, France, in a paper on "Butuminous Coal as a Source of Chemical Products," said that he considered coal more as a chemical than as a fuel. His paper dealt entirely with a comparison of tendencies in high-temperature processing of coal in various countries.

A process by which crushed coal is carbonized by being dropped freely through a high-temperature zone in a vertical retort was described by Alfred H. White, professor of chemical engineering at the University of Michigan. Depending on the size to which the raw material is crushed, the distance through which it falls in the retort and the temperature maintained, the coal can be carbonized to any degree, and as much or as little volatile matter as desired can be driven off. Again depending upon conditions, the resulting product is a porous bubble-like pellet with or without a core of unaltered coal. Professor White believes this process is particularly suitable for the manufacture of a pulverized fuel, in which it is an intermediate step, both preceded and followed by crushing.

Experiments in the development of this process are being made at the University of Michigan. The first tests were conducted in a 2-in. nichrome tube 27 in. long, but in subsequent tests a 3-in. tube was used, to

which continuous feeding was furnished by a worm. Originally the length of this tube was 84 in., but it was reduced in steps to 60 in. The coal was dried, crushed and screened and then fed into the retort in lots of various size, with 14-mesh as the largest. The time of feeding 1 lb. was varied from 12½ minutes to one hour, and temperatures up to 1,600 deg. F. were tried. Sizes under 14-mesh will form gas which cracks in temperatures of from 1,400 to 1,600 deg. F.

Professor White presented a number of figures covering tests on coal from two beds. Two samples of the results of tests conducted under similar conditions were as follows: A feed of 1 lb. of raw coal from the Elkhorn bed of Kentucky containing 36 per cent of volatile and ranging in size from 20- to 28-mesh at a temperature of 1,475 deg. F. yielded a semi-coke of 5.5 per cent volatile and 6.3 cu.ft. of gas. Under the same conditions a feed of 1 lb. of coal from the Illinois No. 6 bed containing 47.4 per cent of volatile matter yielded a semi-coke of 29.7 per cent volatile and 5.4 cu.ft. of gas.

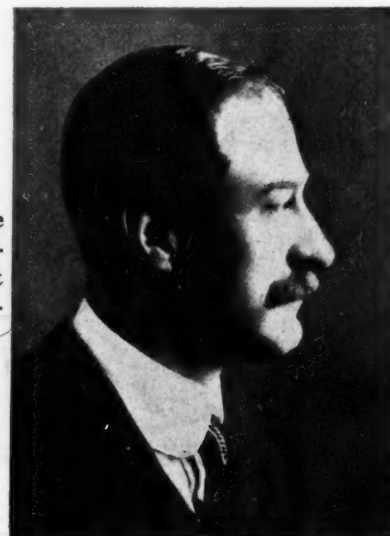
Dr. Lander remarked that similar experiments are being conducted in England with approximately the same results. In these a 21-ft. vertical column is arranged so that the heat zone can be varied.

Frank F. Marquard, superintendent of the Clairton byproduct coking plant of the Carnegie Steel Co., outlined some of the results of experiments in high-temperature coking conducted by his company. Prior to these experiments coke was produced at an oven temperature of 1,800 deg. F. from Pittsburgh seam coal from the Connellsville region mixed with 10 to 25 per cent of low-volatile coal.

The experiments lasted two months and involved the entire plant, which produces regularly about 20,000 tons of coke daily. They were undertaken to determine whether the exclusive use of the high-volatile coal would furnish a satisfactory coke for blast-furnace operation; also to ascertain the effect of lowering or raising the oven temperature from the 1,800-deg. mark.

First the temperature was lowered in steps of 50 deg. until it reached 1,600 deg. Progressively, as the temperature fell, trouble developed in operating the blast furnaces while the amount coke produced increased and the output of pig iron was curtailed. A second group of experiments was then conducted in which the temperature was raised in steps of 50 deg. until the 2,100-deg. mark was reached. The coke improved and so did blast-furnace operation with each increase in temperature. The

Harald Nielsen,
who described the
Laing & Nielsen Proc-
ess, of Sensible Heat
Distillation, Ltd., Lon-
don, England.



experiments were stopped at 2,100 deg. because the refractory lining of the ovens will not withstand a much higher temperature.

The experiments proved that high-volatile coal of itself can be successfully coked for metallurgical purposes and that the higher the temperature the better became the coke. This held true at least up to 2,100 deg. All the ovens are now being operated at about this temperature without the use of any low-volatile coal. One of the blast furnaces during a one-month run produced an average of 823 gross tons of pig iron per day using only 1,825 lb. of coke per gross ton of iron. At first the blast-furnace men complained because the strength of the coke was slightly decreased, but they have since learned how to use it. The Steel Corporation feels that it has benefited at least to the extent of eliminating the low-volatile coal of high cost.

W. S. Landis of the American Cynamide Co. told of the experience of a certain company in producing exceptional coke by processing slack coal. The coal was ground to 100 mesh and then washed by flotation, the ash content being thus reduced from 16 to 3½ per cent. It was then pressed into cakes and moved by a conveyor to the coke ovens. A beautiful silvery coke resulted.

Dr. Campbell urged further study of the washability of coking coals of high ash and sulphur content for metallurgical use. He had in mind the lower-measure coals of central Pennsylvania. Mr. Affelder said that his company had tests made on one of these particular coals by a number of present-day washing and cleaning methods, but in no case were the results satisfactory. The inherent ash and sulphur was not removed. Another difficulty is presented by the fact that the sulphur content varies between fairly wide limits from place to place in the mines producing these coals.

Utilization of Coal Tar and Growth Of the Industry Described

The first paper presented before the Coal Tar Utilization Section on Tuesday afternoon was by S. R. Church, consulting engineer, of New York City, and was entitled "Utilization of Coal Tar Products." Mr. Church showed that whereas in 1901 only 60,000,000 gallons of coal tar was produced, in 1925 this figure had risen to 520,000,000 gallons. Of the 60,000,000 gallons in 1901, none was burned as fuel, 10,000,000 gallons was used for road construction and 50,000,000 gallons was dis-



Dr. Walter Runge, of the McEwen-Runge Process, of the International Combustion Engineering Corporation, operating at Milwaukee, Wis.

Walter Barnum, president, National Coal Association, who spoke on the Coal Situation and Depreciated Government Control



tilled. In 1925, 220,000,000 gallons of coal tar was burned, 100,000,000 gallons was used for surfacing roads and 200,000,000 gallons was distilled.

The increased efficiency of coking processes is illustrated by the fact that the coal tar from all sources increased from 7.1 gallons per ton of coal coked in 1916 to 8.6 gallons per ton of coal in 1924. At the same time the "free carbon" content of coal tar decreased from 8.6 per cent in 1912 to 7 per cent in 1923.

Among the many uses to which coal tar and its derivatives have been put were mentioned paints, varnishes and printing inks, drugs and disinfectants, protective coatings, roofing, lampblacks and carbons, road materials, wood preservatives, fuel and various other metallurgical and miscellaneous uses.

John M. Weiss, consulting chemical engineer of New York City, next presented a paper entitled "Coal Tar Disposal." This paper was principally confined to two phases of the coal-tar industry: First, the improvements in tar distilling methods and, second, the means by which the pitch burden has been lightened, and probably eliminated for all time, as a factor in the coal-tar industry.

Referring to the first of the above phases of the industry, Mr. Weiss said: "Developments in the distillation of tar have contributed in no small measure to its value. At present market prices for tar oils, the extra value obtained by proper and efficient methods of distillation may amount to as much as 2c. per gallon of tar when compared with the methods in use about ten years ago."

With reference to the disposal of coal-tar pitch he stated that: "The great burden of the tar industry has been the disposal of pitch. Oil could always be moved at a price, but not so the residuum. Considerable effort was expended on the problem, and pitch coke proved to be the solution. That discard of the coal-coking industry, the beehive oven, was found to be best adapted to coking pitch, and in the last five years over 300,000 tons of pitch has been coked in these ovens."

Following Mr. Weiss, Robert M. Crawford, chemical engineer of Pittsburgh, Pa., read a paper entitled "The Recovery of Phenols from Steel Plant Fuel Tars." Mr. Crawford stated that nearly 60 per cent of the coal tar annually produced in the United States is burned as an industrial fuel. The steel industry, he said, of course, is the largest producer and consumer of coal tar in this country, and has logical reasons for using coal tar as a

fuel. It is a convenient, cheap and dependable source of heat and it is claimed that better steel melts can be obtained with coal tar than with fuel oil. These and other less obvious reasons contribute to the burning of tar by the steel industry.

Only about 20 per cent of our present annual consumption of phenol (carbolic acid) is produced from coal tar, its natural source. The remainder is produced synthetically. Approximately 5 per cent of the creosote and other cresols used in this country is supplied from



Andrew W. Mellon,
Secretary of the Treas-
ury, formerly Presi-
dent Mellon National
Bank, Member Advis-
ory Board of Confer-
ence

domestic coal tar. The remainder is imported. There is being burned annually, in the form of coal tar, enough phenol to supply an additional 13 per cent of our needs of this substance. At the same time we are burning nearly twice as much cresol as we now use. The general situation just outlined does not appear to be economically sound when it is considered that the phenols and cresols could easily and cheaply be removed from the coal tar without seriously affecting its fuel value.

The final paper of the afternoon, "Naphthalene Formation in Coal Tar," was prepared by Drs. Y. Kosaka and Y. Oshima. In the absence of Dr. Kosaka, it was presented by Dr. Yoshikiyo Oshima, director of the Imperial Fuel Research Institute and professor of applied chemistry at the Tokio Imperial University, Japan. In this paper was presented the results of an original and interesting research which may be summarized as follows:

(1) Naphthalene formation by "cracking" benzene, toluene, phenol, a cresol fraction of a tar obtained by low-temperature distillation and a higher phenol fraction of the same tar, was studied.

(2) The reaction between carbon and phenol also was studied.

(3) A theory was proposed that some naphthalene is formed through the decomposition of phenols which are formed during the early stages of the carbonization of coal.

In conclusion, Dr. Oshima said: "It may be correct to state that phenols in low-temperature tar are reduced to lower phenols under the conditions prevailing in the carbonization retort. They may also be reduced to hydrocarbons under the same conditions. The formation of carbon monoxide in city gas is due not only to the reduction of carbon dioxide but also to the reaction between carbon and phenol vapors."

An animated discussion, led by Dr. Charles M. A.

Stine, chemical director of E. I. duPont de Nemours & Co., Wilmington, Del., followed, during which many questions of interest to the byproduct oven operator, as well as to the organic chemist, were discussed.

Hammond Cites Rise in Power Output; Coal Consumer's Responsibility Told

"Some time ago," said John Hays Hammond, acting chairman of the Tuesday evening (Nov. 16) session of the International Conference, "it was said that in the United States every man had in the power furnished him the equivalent of thirty servants, but with the advent of the automobile the number would now seem to be nearer fifty. No wonder every one enjoyed a standard of living far higher than that in times past." In the days of Adam Smith it took 3,000 times more human labor to make a pin than it does today. In as recent a time as 1900 it took seven times as much labor per ton of product in the iron and steel industry as now and twelve years ago the automobile industry had an output per man but one-third as great as at the present time. Ten thousand men in the coal industry release from the earth enough coal to do as much work as 41,000,000 wage earners.

However, the output of the coal mines per year has increased only 67 per cent since 1890 because of the increase in the difficulty of mining due to greater depth and increased distance.

The automobiles of the United States have an aggregate horsepower approximating 500,000,000. The demand is continually for more and more mechanical energy. Popular opinion looks largely to water as a source of power but 55,000,000 hp. is the aggregate of all the power that the rivers of the United States can supply and that aggregate is available only 50 per cent of the time. Of this, 10,000,000 hp. has already been harnessed and much of the rest is so located as to be of doubtful value.

ONE TON FOR TWENTY

The demand for coal would be large and insistent were it not that large economies in the use of fuel are being made. Newcomen could get but one horsepower hour from 30 lb. of fuel. The steamship Savannah, the first to cross the Atlantic by mechanical means—that was in 1820—used 10 lb. of coal per horsepower hour. The Lusitania in 1906 made that unit of power from only 1.4 lb. of coal. In 1919 the public utilities used 3.2 lb. per kilowatt-hour and in 1925 the figure had dropped to 2.1 lb., an increase in efficiency of 54 per cent. In 1925 the world produced 17 per cent more energy, including water power, oil and gas, than in 1913, but, as much of the bituminous coal had been displaced by lignite, the world probably was mining less heat units than in 1913 rather than more. Mr. Hammond credited F. G. Tryon, of the Bureau of Mines, with much of the information his article contained.

Mr. Hammond said that all the evidence pointed to the fact that the mine mouth usually was not an ideal place for a utility plant. Whether it was the correct place for the refining of the raw coal was a matter not so clear. In the day when oil refining dwindles for lack of raw petroleum it may be a fortunate oil company which has its plant where it can convert its operations to suit the needs of the producer of the primary or the byproducts from coal. Gas may yet be manufactured

at the mines and sent under high pressure to cities, and the plant may obtain a balance in operation by a conversion of the gas produced in the summer into oils by some of the processes recently discovered or that may be evolved in the future.

Walter Barnum, president of the National Coal Association, followed with a discussion of "What Bituminous Coal Is Doing for Itself and the Nation," declaring that much of the trouble in the coal industry arose from the difficulties of the railroads and the unsettling effects of British coal strikes. The bituminous coal industry was always ready, strike or no strike, to deliver adequate supplies of coal to the public. It was a fortunate situation that when the public clamored for coal the industry was big enough to comply with the demand—provided always that the railroads were able to deliver what the coal companies were equipped to produce.

"The coal industry, it has been said," declared Mr. Barnum, "is a most seasonal industry." That, however, is an indictment of the consumer. His buying habits cause that seasonality. It has been proposed that the U. S. government regulate the industry and so make it run more steadily. But such regulation, if it is to be effective, must be applied to the purchaser, or consumer, and not to the producer, seeing that the consumer is the sole source of the irregularity in operation.

Dr. E. E. Slosson's remarks were in a more popular strain. With an accurate knowledge of science he combines a power to make the scientific as well as the unscientific person think and laugh concurrently. He said it was useless to ask the public to conserve values at a loss. With all the interest being shown, at the convention and elsewhere, in the wealth locked up in tar, the use of that product as fuel was increasing in the United States. The chemist of this country had hitherto been engaged mainly in splitting up complicated atomic structures—"cracking" them as it is technically termed. Hereafter perhaps he will be found rather synthesizing, or building, the more complex substances from the more simple, in place of ruthlessly simplifying the former.

Fischer and Gill Papers Elicit Comment On American Wastefulness

The first speaker of the Wednesday morning session of the International Conference was Prof. Franz Fischer, director of the Institute of Coal Research, Mülheim-Ruhr, Germany, who presented a paper entitled "The Synthesis of Petroleum." Dr. Fischer, who is the leading research worker on coal in Germany today and who developed the lignin theory of the origin of coal, said in part:

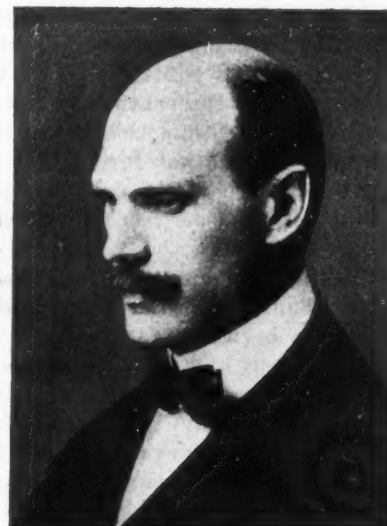
It is possible to produce petroleum-like products from the bitumen of coal, peat and oil shale, and from waxes and fats by decomposing these substances by distillation. This distilling operation is carried on at low temperatures either with or without pressure. As a substitute for natural petroleum, which is lacking in many countries, these raw materials can be taken into only partial consideration, for in this process it is not a question of synthesis in the stricter sense of the word. Synthesis implies the combining of smaller particles, whereas in Professor Fischer's operation it is principally a breaking up of the larger molecules into smaller ones. It is, therefore, not a composition but a decomposition.

Dr. Fischer then reviewed the entire work on low-temperature distillation of coal, peat and oil shale, and followed this with a brief discussion of the Bergin hydrogenation process (which was described by Dr. Bergius himself in detail to the conference on Monday afternoon). After discussing the older work on the synthesis of higher molecular weight hydrocarbons from lower ones, the original work on the reduction of carbon monoxide was described. This led up to a discussion of Dr. Fischer's work on the hydrogenation, under pressure, of carbon monoxide in the presence of certain catalysts to produce "synthal" (a mixture of many organic compounds, many of which are various alcohols, aldehydes, ketones and acids). The paper concluded with a detailed description of Dr. Fischer's latest work on the synthesis of hydrocarbons from carbon monoxide and hydrogen at normal pressures and at relatively low temperatures.

The second paper of the session, "English Developments in Carbonization of Coal in Gas Works," was read by Geoffrey M. Gill, consulting engineer of London, England. He said: "People not acquainted with the gas industry sometimes are prone to think that gas has had its day and that electricity will take its place. There are no indications of such a transformation and in fact where electricity has been most strenuously advocated, there gas also is making satisfactory progress. Both are essential services and both will so continue. As I view the situation in Europe and in the United States, both gas and electricity have great future prospects."

Mr. Gill then gave a complete and detailed account of the English gas coals—their analyses and general characteristics—and pointed out the growth of gas consumption in the British Isles, which today amounts to about 450,000,000 cu.ft. daily. With the aid of slides

Sumner B. Ely,
secretary of Conference
and Professor of Mechanical Engineering,
Carnegie Institute of
Technology



he showed the development of carbonizing plants to their present design; the complete gasification processes; low-temperature carbonization equipment; the continuous vertical retorts; waste heat boilers and the refractory materials used. He said that at present about 42 per cent of all the gas manufactured in the British Isles was made in vertical retorts. To illustrate the increased efficiency of carbonization process in England he said that "where 5.5 cu.ft. of gas was produced per pound of coal in 1921, by 1925 the figure had risen to 6.02 cu.ft. per pound of coal carbonized. In

1921, 12.15 gallons of tar was recovered per ton of coal, and in 1925, 13.45 gallons.

The discussion which followed was led by Dr. Arthur D. Little, consulting engineer of Cambridge, Mass. In commenting on Dr. Fischer's paper Dr. Little said: "My first thought is particularly distasteful to our national complacency. For while Europe is endeavoring to increase the value of fuel, we are wasting it. At the present rate of consumption we have proven oil sands capable of supplying us with petroleum for only six years. On Oct. 26 last there was produced the enormous total of 2,680,000 barrels of crude petroleum. Based on the figures given by Dr. Fischer, it would require 1,600 lb. of coal to produce one barrel of oil by his process. If all of the petroleum we now consume annually had to be produced by the process just described, it would take all of the coal now mined in the United States.

Referring to Mr. Gill's paper, Dr. Little said that whereas in 1905 the United States consumed 112 trillion cu.ft. of manufactured gas, in 1925 the figure had risen to 422 trillion cu.ft.—an increase of 376 per cent in twenty years. The use of vertical carbonizing retorts in the United States is extensive and ever-increasing, although the coke produced from them is not usable as a metallurgical fuel. Dr. Little said that he believed we were destined to see super-gas stations at the mouths of coal mines, although we might not see super-power electric stations at those points.

Urges Advantages of Soft Coal In Producing Gas

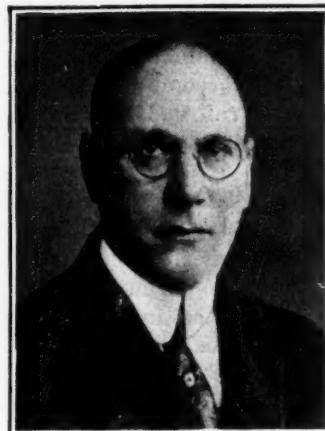
"Despite the very general and successful use of anthracite coal and coke, there are a number of arguments for the use of bituminous coal as a gas-generator fuel," said W. H. Fulweiler, chemical engineer for the U.G.I. Contracting Co. of Philadelphia, Pa., in opening the Gasification Section of the Wednesday afternoon session of the International Conference. "Bituminous coal is cheaper than coke; it is more generally available and would, therefore, carry a lower freight rate. The differential in the delivered price between bituminous coal and coke has varied widely during the last twenty-five years.

"Taking an average for the last twenty years of about thirty plants scattered throughout the United States, there has been a differential of from \$2.50 to \$3. per ton in favor of bituminous coal. Shortly after the European war, this differential increased to about \$5 to \$6 per ton and since that time it has gradually decreased. For the present year the differential at the thirty plants previously mentioned is about \$2.34 per ton, but in many cases bituminous coal of less favorable composition can be obtained at prices which show a much larger difference. There is, therefore, a strong economic incentive to use the lower priced fuel if it can be made to give equally satisfactory results under existing operating conditions."

Following Mr. Fulweiler, C. J. Ramsburg, vice-president of the Koppers Co. of Pittsburgh, Pa., read a paper entitled "A Revolutionary Improvement in Gas Production." Mr. Ramsburg said that under modern methods heat is delivered in the form of gas with much higher efficiency than in the form of electricity. As an example he stated that 1 lb. of coal having a heat-

ing value of 14,000 B.t.u. only 2,250 B.t.u., or 16 per cent of its heating value, is delivered by the most modern electrical plants. A modern gas plant, using mixed coal and producing blue gas from the resulting coke and crediting only the fuel value of the byproducts, can deliver 9,000 B.t.u., or more than 60 per cent of the heating value of the coke.

Mr. Ramsburg then went on to explain in detail the construction and operation of an automatically operated water-gas producer. By the use of the A-B-C constant clinkering generator base and the Howard



W. H. Affelder,
Assistant to President,
Hillman Coal & Coke Co.,
Presided at High-Tempera-
ture Carbonization Session

automatic charger, he stated that the problem of the continuous production of carbureted water gas and blue gas had been solved. Higher capacities and efficiencies, and much greater dependability of operation, are assured through the use of this system, Mr. Ramsburg said. Bituminous coal operation was discussed in connection with this new apparatus, which affords a system of complete gasification that is entirely automatic.

The last speaker of the afternoon was Mr. H. A. Brassert, consulting engineer of Chicago, Ill., whose paper was entitled, "Utilization of Heat in Modern Steel Plants." "The iron and steel industry annually consumes approximately 115 million tons, or 20 per cent, of this country's production of bituminous coal," said Mr. Brassert. "The larger percentage of this coal is completely gasified, either in gas producers or in coke ovens, the coke being subsequently used in blast furnaces or iron cupolas. Only a relatively small percentage is fired under boilers or otherwise used raw."

The great commercial value of the surplus coke-oven gas has been fully realized, Mr. Brassert said, but the value of the blast-furnace gas has not been generally appreciated. The coal which is annually used in the coke ovens of this country produces gas having a heating value of about 448 trillion B.t.u., equivalent to approximately 17,200,000 tons of coal. Of this, about 25 per cent is entirely wasted because that percentage of the coal is coked in beehive ovens. On the other hand, for each ton of pig iron made, approximately 140,000 cu.ft. of blast furnace gas is produced. At 94 B.t.u. per cubic foot of gas, this represents 13,160,000 B.t.u. per ton of pig iron. And as the annual production of pig iron is about 36,000,000 tons, 473,760 billion B.t.u., equivalent to 18,220,000 tons of coal, is produced in this manner.

Mr. Brassert then explained in detail how the iron and steel plants were utilizing part of this heat and outlined methods by which they could further the use of blast-furnace gas in their plants and outside of them. He also discussed many other fuel problems of the iron

and steel industry and offered suggestions for their solution.

The session concluded with an animated discussion of the various papers presented, during which many questions relative to water-gas producer operation were raised. Prof. Wilbert J. Huff of the gas engineering department of Johns Hopkins University, who led the discussion, also asked several questions to which the authors replied.

Prepared Fuels Play Important Role In Solving Smoke Problem

The Smokeless Fuel Section of the International Conference on Soft Coal met in the faculty club room of the Carnegie Institute of Technology on Wednesday afternoon, with Dr. Charles H. Herty, president of the Chemical Foundation, presiding. In a paper on "Economic Aspects of the Conversion of Coal Into Smokeless Fuels," Horace C. Porter of Philadelphia, Pa., showed that coal or its equivalent to the extent of 200,000,000 tons is now being burned without much smoke. The remainder of our annual output, exclusive of metallurgical coke and marine bunker coal, amounts to about 300,000,000 tons and is being burned by small plants, in homes and in railway locomotives, producing the smoke with which smoke-abatement problems are chiefly concerned.

In estimating the cost of low-temperature carbonization he assumed that 25 per cent of the original heat in the coal is lost in processing and he considered gas and tar purely as byproducts. In treating one ton of coal he estimated the gain in value as \$2.88, consisting of \$1.44 derived from 24 gallons of tar at 6c., and \$1.44 from 32 "therms" (100,000 B.t.u. each) of gas at 4½c.

WILL PUBLIC PAY MORE FOR SEMI-COKE?

Mr. Porter fixed the losses entailed by processing at \$1.92, comprised of \$1.12 from heat value of coal dissipated plus 96c. covering margin for profit and contingencies to the extent of 20 per cent. This leaves a credit of 96c. to defray the cost of processing if the primary product was sold at the price of coal. If, however, a semi-coke would command a premium equivalent to, say, 20 per cent margin in price, \$1.50 would be left for conversion costs. Dr. Lander said that his estimates closely agree with Mr. Porter's.

"The innocent phrase 'smokeless coal,' seeming so simple, is charged with various meanings," said O. P. Hood, chief mechanical engineer of the U. S. Bureau of Mines, in a paper entitled "Smokeless Coal." To the layman the term means exactly what it infers, but to the dealer it has a different significance. To him such coals mean semi-bituminous fuels that smoke but little because of their low volatile content. In commercial trade, however, this term is being misused to the extent that the upper limit of volatile matter has been stretched and often is applied to coals that are smokeless in name only when compared with anthracite and coke as standards.

In one part of his paper, bearing on the theme of the conference, he said: "With volatile matter removed by heating, the remaining char or coke of all our fuels may be made to come well within the smokeless range. But only a relatively few of our coals when heat-treated according to our best present knowledge retain physical characteristics of coherence and strength that make them immediately desirable as a commercial fuel.

"To give strength, coherence and acceptable form value, briquetting is resorted to. The usual binder, unfortunately, adds smoke-producing material, so that a second heat-treatment is required to produce a really smokeless fuel for domestic use. In the future we can expect an increasing number of manufactured fuels in briquet form rebaked at a sufficiently high temperature to reduce the volatile matter below 8 per cent."

The discussion at this session was led by R. T. Haslam of the Massachusetts Institute of Technology, the only institution of learning having a fuel school. He said he knew of only one or two processes aimed toward the production of truly smokeless fuel. To be smokeless, processed fuel must bear a close resemblance to anthracite. Such fuels will yield a premium in selling price, and the more nearly they are freed from the faults of anthracite—difficulty in firing, high cost and high ash content—the more easily will they be marketed.

F. C. Greene of Chicago said that the cost of shipping fuel of the density of coke is about 30 per cent higher than that of coal. He is of the opinion that semi-coke should possess a density as great or greater than that of coke and that the processing plant should be located at the mine. Weight for weight, carbonization increases the ash content of fuel. He made a statement, with which but few can logically agree, to the effect that since the public is accustomed to fuel containing 10 to 15 per cent ash, no attempt should be made to furnish a processed fuel of lower ash content.

When Will Fertilizer Market Revive, Thus Aiding Coke Producer?

Dr. Louis C. Jones, of the Nitrogen Engineering Corporation, New York City, read the first paper at the meeting of the fertilizer section on Nov. 17. He said that the sources of commercial nitrogen were Chilean nitrate, byproduct sulphate, Norway arc-process nitrate and cyanamid.

The proportion of fixed nitrogen produced from fuel by the Haber, Claude and related synthetic systems is about 80 per cent, that from cyanamid about 12 per cent, that by arc methods 5 per cent and that by electrolytic methods 3 per cent. Although the hydro-electric proc-

S. R. Church,
Consulting Engineer,
New York City,
Who Discussed
Coal-Tar Products

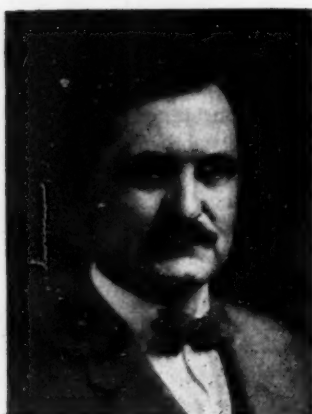


esses for producing fixed nitrogen—that is, the arc and cyanamid processes—were developed at least ten years ahead of direct synthesis, still the latter process has far outstripped all competitors.

Harry A. Curtis, professor of chemical engineering, Yale University, said that coal was a source of power, of hydrogen and of nitrogen. In all these ways it was used for the manufacture of fertilizer. The quantity

of nitrogen obtained from coking coal was quite small compared with the quantity in the original substance. Assuming that the average percentage of nitrogen in coal is 1.45 per cent, the sulphate of ammonia yield should be 136 lb. Instead, about all that is obtained is 22 lb., which is about a sixth of the yield that might be expected.

Charles J. Brand, executive secretary and treasurer, the National Fertilizer Association, discussed the



H. A. Curtis,
Professor of Chemical
Engineering, Yale
University.

"Economic Aspects of the Fertilizer Industry." He said "We cannot in conscience hope to sell more sulphate of ammonia, more nitrate of soda and greater quantities of air-derived nitrogen merely to increase the production of cotton, seeing that the quantity already in hand must be sold at an average of no less than 5c. per pound below the cost of production."

Dr. Frederick G. Cottrell, director, fixed-nitrogen research laboratory, U. S. Department of Agriculture, Washington, D. C., said that the principal fertilizers were potash, phosphorus and nitrogen. Already phosphorus was being concentrated electrically, not for fertilizer but for baking powders and the manufacture of ferro-phosphorus. Some day we shall arrive at the use of this means to prepare phosphoric acid for the soil, and a big demand for power will be the outcome. Europe was making nitrates from ammonia, but that seemed too indirect a way. The chemical industry would follow a better course if it sought to combine nitrogen and oxygen without any intermediate stage.

BIG WASTE OF OXYGEN

C. L. Parsons, consulting chemist, Washington, D. C., said that in the manufacture of ammonia at a certain plant 600,000 cu.ft. of hydrogen and 300,000 cu.ft. of oxygen were produced electrolytically. The latter was thrown away as valueless. He would suggest that it be used in the future for the manufacture of water gas which if made with pure oxygen instead of air would have a higher B.t.u. value.

David Shields, Shields, P. O., Pa., said that coal mixed with salt at 140 to 150 deg. F. had been applied to the soil and had greatly increased its fertility.

Mr. Landis declared that the nitrogen-fixation plants of Europe were war or preparedness plants. They could not exist without government help, and they were kept running so that men trained to run them would always be available. The chemical industries, he said, use as much nitrogen as the farms in the manufacture of nitric acid, dyes, etc.

R. S. McBryde declared that much had been said as to the contribution of the coke industry to nitrogen fixation. He would like to say something as to the

way in which the nitrogen industry contributes to the coke industry. The cost of a ton of pig iron is increased 30 to 40c. when there is a decline of 1c. per pound in the price of ammonium sulphate and the cost of city gas is increased to 2 to 5c. per 1,000 cu.ft. for every like decline.

Parr, McIntire and Nielsen Expound Their Semi-Coking Processes

S. W. Parr, professor of applied chemistry, University of Illinois, believes that coals of the Middle West, high in oxygen and free water content, are better suited for low-temperature processing than the coals of Pennsylvania. At a general session of the Bituminous Coal Conference held at the Carnegie Music Hall on Thursday morning he presented a paper on "Low-Temperature Carbonization of Bituminous Coals of the Mid-Continental Type." W. R. Addicks, senior vice-president of the Consolidated Gas Co., New York City, presided.

The University of Illinois has been conducting experiments in low-temperature carbonization since 1902. These have resulted in the development of a process the principles of which are here briefly stated:

The coal is first conditioned by being heated to a temperature within 25 to 50 deg. of the softening or pasty stage in a rotating drum, which also serves as a heat exchanger for the spent gases from the retort flues. At this point the coal is poured into a retort already heated to the maximum temperature desired for the coking stage of the process. The heat penetrates to the center of the mass in from 10 to 30 minutes. The resulting coke is dense and strong, is substantially free from breeze and need only be crushed and sized to make it suitable for domestic use.

C. V. McIntire of New York, described a process of low-temperature distillation, based on the old Carbocoal process, by which a semi-coke is formed that is suitable for burning "as is" or in the pulverized state for steam and other purposes, or for domestic use when formed into briquets. This process was developed by the Consolidation Coal Products Co. at a plant in Fairmont, W. Va., and during the last two years has converted about 22,000 tons of coal into semi-coke and other derivatives. The plant is in continuous operation and its equipment is of such design and capacity as would meet the requirements of a single unit in a multiple-element plant of commercial size.

Harald Nielsen of London, England, presented the principles on which the "L & N" process is based and outlined the results obtained and obtainable. The process involves distilling of bituminous coals or lignites in one continuous operation in an internally heated rotary retort.

Low-Temperature Coking Discussed

In presenting his paper on "The McEwen-Runge Process for the Low-Temperature Distillation of Coal," Dr. Walter Runge of the International Combustion Engineering Corp., of New York City opened the Thursday afternoon session which was devoted entirely to a discussion of various processes of low-temperature coal distillation. Dr. Runge reviewed McEwen's early work along these lines and explained in detail the Milwaukee development unit and the Lakeside commercial unit (of the Milwaukee Electric Railway & Light Co.), both of which use the McEwen-Runge process. He then discussed the reasons for employing dual retorts and ex-

plained the heating of the charge and the circulation of the gas, the calculation of gas values and the "de-coking" of coal.

The next paper, "The Greene-Laucks Process of Low-Temperature Carbonization," was presented by F. C. Greene of the Old Ben Coal Corp. of Chicago, Ill. Mr. Greene prefaced his paper with the statement that "low temperature fuels are as a rule notoriously weak, spongy, light-weight and rapid burning—all these qualities being undesirable in the domestic market although perhaps not objectionable in other fields. Our trade is almost entirely domestic and, as such, demands a heavy, strong, dense, smokeless and clinkerless fuel, in short, one that will ship like the strongest coals and burn as well, or better than, the highest grades of anthracite or Pocahontas. For the last two years we have been producing, at our pilot plant at Waukegan, Ill., such a fuel from southern Illinois screenings."

This pilot plant has an average capacity of 18 to 20 tons of raw coal and braize per day of 24 hr. Units 9 ft. in diameter and 18 ft. long are under consideration at the mines in batteries of ten. The 24-hr. capacity of such a battery will be 500 tons.

"The Piron Coal Distillation Process" by Emil Piron, consulting engineer, New York City, and Robert M. Crawford, chemical engineer of Pittsburgh, Pa., was presented by Mr. Crawford in the absence of Mr. Piron. The details of construction of the ovens used in this process appeared in *Coal Age*, Vol. 25, No. 5, Aug. 2, 1923, pp. 171-173. In the present paper Mr. Crawford explained how the mechanical difficulties experienced with the original ovens had been overcome and presented operating data from the two units erected by the Ford Motor Co. at River Rouge, Mich., and Walkerville, Ont. He then gave complete data relating to five runs, of variable length, made with these ovens.

Less Complex Low-Temperature Processes And Tar-Cracking Equipment

Three processes—the Bussey, Carbocite and Dubbs—the first two for low-temperature carbonization and the third for low-temperature tar cracking—were described at the last session of the Bituminous Coal Conference in the evening of Nov. 18. W. E. Fohl, consulting engineer, of Pittsburgh, Pa., presided. The meeting was held in the Central Building of the Carnegie Institute of Technology.

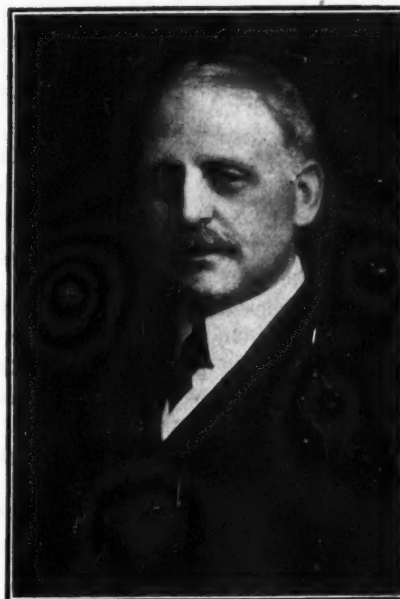
Richard B. Parker, consulting engineer, New York City, discussed "The Bussey Process of Low-Temperature Distillation," which he described as so extremely simple that when he was informed of its method of operation, he was frankly skeptical of its value. It was so obvious in conception that he could not see why it had not been tried before. The purpose of the inventor was to devise a thorough and simple process without attempting any elaboration.

Gustav Egloff, of the Universal Oil Products Co., Chicago, Ill., in his paper on "The Cracking of Low-Temperature Tars by the Dubbs Process," asserted that the motor fuel produced from low-temperature distillation of coal and the cracking of its tar will more than double the mileage per gallon that can be obtained by the use of ordinary gasoline when operating a high-compression motor. The superior quality of this type of motor fuel is due to the high percentage of aromatic and unsaturated hydrocarbons therein contained.

The coke residue from the distillation of tar is practically free from ash and can be burned without smoke. The gas is of a high calorific value and can be used, therefore, for the enrichment of water or producer gas. The motor fuel produced from the cracking of the neutral oil contains over 50 per cent of aromatic hydrocarbons, thus constituting an excellent anti-knock motor fuel for the operation of a high-compression motor. About 2 lb. of coke and 20.3 cu.ft. of gas are formed for each gallon of neutral oil cracked.

Clarence B. Wisner, of The Carbocite Co., Canton, Ohio, then described the method of carbonizing used by his company. It consists of two processes, the first being known as "thermodizing," which Mr. Wisner described as heating the raw coal in an oxidizing atmosphere to such a temperature that the water vapor would be driven off. This reduces its swelling and agglutinizing quality to the extent desired.

The product is subjected later to a carbonizing process in a closed rotary container heated extraneously to a temperature that drives off much of the hydrocarbon content. In this container the coal is converted into balls, the diameter of which should not exceed 4 in. if sufficient devolatilization is to take place. Domestic coal users are purchasing 500 lb. of breeze to every ton of balls, using the former to fill the voids and bank the fire at night, thus obtaining more uniform combustion.



W. R. Addicks

Some high-volatile coals that swell excessively have to be blended with coals which do not swell so markedly. The fuel obtained weighs about 27 lb. per cubic foot when made from 85 per cent of the No. 6 bed coal of Ohio and 15 per cent of the No. 8 bed of the same state or from three types of Indiana coal. This is a density about equal to that of byproduct coke from the same source.

Dr. F. Mueller, director, low-temperature carbonization plant at the Mathias Stinnes mine, Essen, Germany, and F. E. Brooker, Chemical & Physical Process Corporation, New York City, who were listed on the program of this session for talks on "Low Temperature Carbonization of Coal" and "Hydrogenation of Coal at Low Temperatures," respectively, were not present, nor were their papers made available.

Illinois Institute Discusses "High Power" Blasting And Increased Production Efficiency

Tests Demonstrate Possibilities of CO. in Reducing Small Sizes and Increasing Safety in Mining—Institute Stresses Quality of Air as Well as Quantity—Lewis Says Efficiency Is Hope of the Industry

AFTER a morning of golf, renewing acquaintances and making new friends among the members, the Illinois Mining Institute opened its fall meeting at the Harrisburg Country Club, Harrisburg, Ill., on the afternoon of Nov. 13.

E. G. Lewis, the president, opened the meeting and in welcoming those present paid them a compliment for the large attendance. The reports of the various committees and officers were received. The most interesting of these was the secretary's report showing increased membership and the sound condition of the Institute's treasury. The secretary read a letter from A. J. Moorshead, president and general manager of the Madison Coal Corp., in which he stressed the necessity of the operators encouraging the Institute in its work in attempting to solve the technical, safety and operating problems of the industry, particularly as they applied to Illinois. He stated also that it was the duty of the members to do their part. In 1897 the operators knew little of each other, but have since, by friendly association, assisted one another in improving efficiency and safety and in meeting their economic problems. Mr. Lewis asked that more of the miners take an active part in the proceedings and work of the Institute, stating that it was for their benefit also.

W. E. Kidd was elected president for the coming year; L. E. Young and James Anderson, first and second vice-presidents, respectively. The new president, Mr. Kidd, took the chair and conducted the meeting from here on.

A. D. Lewis, director of the State Department of Mines and Minerals, Springfield, Ill., assured the Institute of his personal desire and that of his department to co-operate with it in the work it was doing in promoting safety and efficiency within the industry in Illinois.

Hugh Murray told of his experiences during the introduction of electricity in the mines about 1900 and how the parties at interest laid plans at that time for today, and today, he said, is the time to lay plans for tomorrow—for bigger and better things in mining. Mr. Murray compared the New Orient mine of today with some of the model mines of the 80's. For instance, at Briceville, Ill., 1,200 tons per day was hoisted with cars of 1,600-lb. capacity. At that time this was record hoisting and meant real work and study.

Mechanical loading is making progress in relieving the miner of the burden of hard labor. Mr. Murray saw the beginning and introduction of cutting machines. Cumbersome as they were, they fulfilled their purpose.

Based upon the progress machinery in mining has made since that time, he believes that the day is not far distant when machinery will take all the hard labor from man; the miner will use his brain instead of his muscle.

At the evening meeting George Bagwill, of the J. K. Dering Coal Co., discussed the new method of mining coal which he called "high-power" shooting. He stated that he saw it demonstrated in four places and that in all of them it was a success. Furthermore, he stated that it was his opinion that this method of mining coal was going to be a success and would benefit the entire industry. He said that in a room 27 to 30 ft. wide

Use of carbon dioxide charged into a steel bomb and loaded in place of black powder or permissible explosive results in the production of a larger percentage of lump coal than is at present secured. The bombs can be recharged and used over and over again. The mine atmosphere is not appreciably vitiated by this method of bringing down the coal and a face may be shot repeatedly during a single working shift.

four holes were required by the "high-power" method as against eight for permissible or black powder explosives. The absence of smoke and fumes was beneficial, and no gas could be detected after shooting. Mr. Bagwill said that the introduction of the new method violated no existing mine laws nor was it in any way injurious to the health of the men. It was necessary, however, to

have a perfectly straight hole, and that a core drill be used. The drill that Mr. Bagwill saw used sunk a hole at the rate of 1 ft. per minute and the total drilling time was not more than 10 to 15 minutes more than that required for the use of permissibles or black powder. He stated that the proportion of screenings produced was greatly decreased and should not exceed 15 per cent excluding the "bugdust" made by the cutting machines. Answering an inquiry from Mr. Kidd, Mr. Bagwill said the new method probably would displace shotfirers.

Mr. Bagwill stated that he could give no further information than that the agent used was liquid carbonic acid gas, charged into a special cartridge and gasified by an "ignition compound"; the pressure in the cartridge as charged was at 2,000 lb. per square inch. When asked its effect on solid shooting Mr. Bagwill said that to his knowledge no tests had been made. In answer to a question from the floor, he said the cartridges when recharged could be used over again. W. E. Kidd asked if any powder men had anything to say about their new competitor, but none had.

James S. Anderson asked the Institute to discuss the question of whether quality of ventilation was just as important as quantity. He said that he believed the anemometer as a means of measuring the quantity of air to satisfy the present mining laws was out of date, and that some recognition should be given to quality of air. Laws, according to Mr. Anderson, were made to meet some specific need and as time went on condi-

tions changed to such a degree that existing law was no longer adequate. He believed that it was the quality or the purity of the air that promoted the health and efficiency of the workmen rather than the quantity.

John Melhouse, a state mine inspector, said that often the air was in lawful quantity, and was good in quality but that in addition to measuring the volume there should be developed some means, just as convenient, for making analyses. Mr. Melhouse cited instances of where he had to handle miners' complaints of bad air, but investigation showed that the quantity was legal and the volume sufficient. He therefore, concluded that the mine inspector had a hard question before him to determine the air's quality.

Mr. Melhouse stated that he investigated a case where the miners had gone on a strike on account of bad air and that when he and others looked into the complaint they found that the quantity was good, but after this the miners struck again for the same reason. They then asked for an analysis, and a sample was taken and sent to the U. S. Bureau of Mines. The results showed 20 per cent of oxygen. Since that time Mr. Melhouse said there had been no further complaints.

Mr. Kidd thought that booster fans would give quantity, but without quality, and that when a mine got to the point where it needed booster fans there should be another airshaft put down to furnish a supply of fresh air. Mr. Kidd said that booster fans may satisfy the miners because of the circulation but that the air being handled was likely to be vitiated and tainted with carbon dioxide

on account of having passed over old workings and having been breathed by men and animals. Mr. Anderson, on being asked as to how often these analyses should be made, said that it was the practice of the Madison Coal Corp., with which he was connected, to make their own analyses about once a week and oftener than this if necessary; in general, conditions should govern the frequency of the analyses.

In commenting on the delay in receiving results from air samples after they had been sent to the U. S. Bureau of Mines at Pittsburgh, Pa., Mr. Kidd stated that the State of Illinois should maintain equipment at the state university at Urbana for this purpose. He could see no reason why the mining industry of the state could not receive as much attention and help as was given to agriculture.

Hugh Murray thought that considering the progress that had been made in mechanical loading, some inventive genius could give the mining industry an instrument that was just as convenient in determining quality as the anemometer was in measuring quantity.

The Institute voted to have the future meetings reported by a stenographer, the proceedings to be edited and then printed in book form.

J. B. Pauley, president of the J. K. Dering Coal Co., Chicago, Ill., was the toastmaster at the banquet of the Institute in Harrisburg on the evening of Nov. 13. Mr. Pauley said that though he had tried to analyze conditions he had not decided the reasons for the present spurt in the coal market in which the price received

was in some degree commensurate with the value of the product. Whether the market was going to remain stable he could not say, because, as he saw it, fundamentals had not changed. But now that prices were better able to pay wages to labor as well as a return to invested capital there probably would arise a clamor for regulation of the industry and price investigations would be urged, though no one raised his voice to help the miners and operators during the past few years when prices were below the cost of production, mines were shut down and thousands of miners were idle.

Mr. Pauley characterized as "piffle" the statement of a well-known writer "That excessive and uneconomic production was the curse of the industry"; also the further statement by the same writer that there should be some co-ordinating agency for the 7,000 or 8,000 operators producing upward of 12,000,000 tons per week.

Mr. Dering stated that it was his personal opinion, based upon the failure of the late Coal Commission to solve any of the industry's problems, that any attempts to help the industry must come from within rather than from without. As far as government regulation was concerned he said that if those in the industry

attempted to "take a joy ride with the government they would have to walk back."

Mr. Pauley said that while improved efficiency was the favorite topic for those critics outside of the industry, yet it was a fact that the production per man in this country was higher than anywhere else in the world and that the coal was better prepared and sold for less. Mr.

Pauley thought that we should not attempt to measure our efficiency according to European standards because American standards of living are higher. He said, however, that the yardstick by which we should measure the coal industry's efficiency is the production and performance of other industries. By these standards the industry could furnish the country a low-cost fuel and would yield a wage sufficient to enable the workers to live in good condition, yet keep the operators from going into the hands of the sheriff.

Mr. Pauley stated that the future salvation of the Illinois Mining Institute lay in its progress and progressive methods. Miners, operators and all others interested must work together for a common end.

Mr. Pauley was followed by Dr. L. E. Young, of the Union Collieries Co., who said that the industry worshipped tradition too devoutly. He stated that the operators should not be particularly concerned with how things were done years ago. He told the Institute the industry needs big brains to plan better methods, initiative to advance, and not to wait while somebody else investigates and courage to do bigger and better things.

Mr. Parrish, an attorney of Harrisburg, then spoke in a humorous strain of his eight years' experience in the coal industry as an operator. He said that at one time he had owned a coal mine which was no trouble to him, because the banks and the railroads ran one side of his business and the pit committee told him how to run his mine.

Few if any will assert that coal mining has attained the ultimate in the way of efficiency. The time is now ripe for the miners to be relieved of the arduous labor of coal loading substituting therefor the lesser exertion of directing the operation of machines. The miners' organization wishes to foster this transition. By this means the output can be increased, yet the present scale of wages maintained.

Mr. Pauley then introduced John L. Lewis, president of the United Mine Workers, whose address was in substance as follows:

"As evidenced by this association of miners, technicians, operators and representatives of invested capital better feeling exists in this industry than in any other," said Mr. Lewis. In making a brief review of the past few years, he stated that it was not done in a controversial spirit but to establish a justification for the policies and actions of his organization. In the period immediately after the close of the war the nation looked around and the captains of industry began to "take stock" as to their future.

According to Mr. Lewis our sense of values had been disturbed by the war; this was true of bankers, industrial leaders, mine operators and miners alike. He said that it was during this time that our leaders and economists proclaimed that America's future depended upon a higher degree of efficiency and a greater output per man, until overproduction in every commodity spragged the wheels of industry. By November or December of 1920 industry had slowed up, markets were glutted and factories were closed until by May or June of 1921, five and one-half million men were out of employment.

LABOR LIQUIDATION ADVOCATED

Because of this menacing situation the President of the United States called a conference of the leaders in industry in Washington. Their report, however, was of no particular effect. Then, said Mr. Lewis, the same leaders, whose earlier call had been for efficiency, now took up liquidation of labor and decreased wages as the means of salvation for the country. By November of 1921 wage decreases became the order of the day.

The railroad, steel, shipbuilding, textile and lumber industries applied reductions, and the country thought that the miners would be next. Mr. Lewis stated that in 1922, when the miners were asked to take a reduction, the country insisted, and every one believed, that they would take a reduction because other industries had done so. Even the workers who had taken wage reductions looked for miners' wages to be similarly reduced.

THE WAGE CYCLE IS VICIOUS

According to Mr. Lewis the cycle of wages has started downward, yet if the miners had taken a reduction other industries would have reduced wages still further. But, he continued, during the wage conferences purchases were being withheld, as rock bottom was not believed to have been reached in wages. However, the organized operators and organized miners executed a contract in August, 1922, that did not include a wage reduction. Two weeks later, Mr. Lewis said, the U. S. Steel Corp., employing 250,000 men, including those in its mines, restored 10 per cent of the previous reduction and shortly afterward increased wages an additional 10 per cent. The downward trend in wages was thus stopped and increases became the order of the day. Orders were placed, industry once again was busy and the five and one-half million men were re-employed.

Comparing economic and living conditions in Great Britain with those in the United States, particularly in the mining industry, Mr. Lewis stated that the basis of our present prosperity and high standards of living was good wages. He asserted that an authorized report of

the Secretary of the Treasury of the United States showed that one hundred and ten million people of this country earned more in wages than the entire remaining population of the civilized world.

Mr. Lewis said that low wages was not a remedy, but rather an evil. Cost of coal at the mouth of the mine in this country is less than the cost of coal in England, where the miners accepted the philosophy of lower wages as a solution of post-war evils. The production of the American miner is approximately 4.56 tons per man per day, while that of the English miner has decreased from about 1,896 lb. per man per day before the reduction to approximately 1,700 lb. after the reduction. Output of the American miner, he said, was greater than that of any other country and was due to the miners' efficiency and to the mining engineers and operators. It showed what could be done by co-operation and the recognition of the mutuality of Capital and Labor. The miner of today, he stated, was the technician of tomorrow because in this country we do not recognize class but merit.

PURCHASING POWER MUST BE MAINTAINED

American leaders in industry and in finance recognize that they must find an outlet for this increased productive efficiency and that to absorb this increase they must maintain purchasing power. We consume within our own country from 92 to 96 per cent of our total production. What difference does it make, the speaker asked, if the miner spends his earnings for luxuries or for the necessities of life; what difference does it make how much money a coal company makes so long as that money is kept in circulation and turned back into industry? When kept in circulation profits and wages turn the wheels of industry.

Mr. Lewis further stated that "reduction of wages was no panacea for the ills of which the industry complains." Consumption would not increase because the consumer purchases only the minimum amount for his requirements. If the union miners took a wage reduction the pay of non-union workers would be further cut down to assure non-union operators the advantage during a depressed condition.

He said that in 1916 the sales realization for the entire Kentucky coal field was \$1.10 per ton and that these operators could again go to \$1.10 per ton if necessary. He asserted that if wages were once started back there would be no bottom—no stopping place. Non-union operators under the spur of necessity would have no alternative but to reduce them still further.

ANTHRACITE SHOWS THE WAY

Mr. Lewis stated that it was time "to set our house in order," as the anthracite industry had done. This industry conquered its question of cost and poor equipment and was now enjoying 280 to 290 days of opportunity offered to work; the operators were receiving a fair return which by every right they are entitled to. He hoped that the bituminous industry would soon enjoy these conditions.

He has hope for the future of the bituminous industry because he has confidence in the miners and their producing capacity and willingness to accord fair treatment to their employers; confidence in the genius of the technician, and confidence in the courage of the operators and the engineers who plan their operations, for the mutual enjoyment of the finer things of life.

Lehigh Valley Section of A.I.E.E. Hears Addresses On Super-Power and Electric Shovels

Chairman of U. S. Board Says Super-power Is Nothing but Modern Electricity—Advantages of Electric Stripping Shovels Also Are Described—Morea Strippings of Madeira, Hill & Co. Are Visited

By Staff Correspondent

NEARLY 200 MEMBERS and guests attended the regional meeting of the Lehigh Valley Section of the American Institute of Electrical Engineers at Pottsville, Pa., on Nov. 12. This meeting, the first of the season of 1926-27, was held at the Schuylkill Country Club and was preceded by a dinner. On Saturday the members and guests of the Institute, through the courtesy of Madeira, Hill & Co., were taken on an inspection trip to the stripping operations of that company near Frackville.

The principal speaker of the evening was William S. Murray, chairman of the U. S. Super-power Board, consulting electrical engineer for the N. Y., N. H. & H. R.R. and "the father of super-power." Mr. Murray had prepared a paper entitled "Modern Electricity and Its Application to Industry and Transportation." But, because of the unusually fine attendance, he was (as he explained it) "inspired," and therefore gave an extemporaneous talk on "Super-power." In the course of his address Mr. Murray included practically all of the material contained in the paper he originally intended to present.

ELECTRIC SHOVEL NOW WELL ESTABLISHED

The second speaker of the evening was Werner W. Goetz, electrical sales engineer for the Bucyrus Shovel Co., who presented a paper entitled "Electric Shovels." In this paper Mr. Goetz paid particular attention to electrically operated stripping shovels. He said in substance:

"The electric shovel has emerged from the experimental and development stages and is now firmly established as a definite industrial unit. The power shovel owner and operator of today does not, as a rule, question the superior advantages of an electric machine for his work. It is, therefore, no longer necessary to collect and present for his consideration large amounts of favorable evidence to justify the adoption of electric drive. Every new installation strengthens this favorable attitude. As a result of the constant and rapid improvements in electric shovel construction, there naturally have been arguments and differences with reference to their proper application. But during the last fifteen years there is no record, to my knowledge, of an electrically operated shovel having been replaced by a steam-driven machine because of poor performance of the former.

"The advantages of electric power shovels are many. One of their greatest advantages lies in their remarkable freedom from delays and shutdowns—an advantage which the electric shovel has demonstrated from its inception. These shovels can, therefore, be depended upon to deliver large tonnages and continuity of service, which permits of a lower cost per ton of material handled. Other advantages of this kind of shovel are: Except in the railroad type, electric shovels can be operated by one man; they are more efficient; main-

tenance and depreciation costs are lower, and they are cleaner and easier to handle.

"These advantages justify the judgment of owners and operators in paying a higher first cost for the electric shovel than for the same size and type of steam machine. The higher initial cost of the electric shovel is attributable to several factors. The cost of electrical equipment, often of a special type, is higher than that of a boiler and steam engine; more gearing is required in the winding machinery of electrically operated shovels, and this gearing is of a more expensive construction; and, finally, the use of motors on shovels has necessitated a general strengthening of the framework of the machine—because the greater inherent torque of the electric motor permits of more ultimate power being applied to the dipper.

"The electrically-operated shovel reduces unit costs for removing material not because it operates more rapidly than the steam shovel but because it is more reliable and can practically eliminate those bugbears of all excavating problems—delays and shutdowns."

Although the present operations have been conducted only for about the past year and a half, the Morea strippings, near Frackville, have been operated by Madeira, Hill & Co. since 1922. The coal lies in the Buck Mountain bed and consists of two measures each about 20 ft. thick. The first of these, or the one now being worked, is covered by approximately 20 ft. of overburden at the center of the basin. The second is about 150 ft. below the surface at the same point. Coal is loaded by electric shovels into air-operated dump cars and is hauled by dinkey locomotives to a discharge point located about two miles from the actual stripping operations. From here the coal is taken in railroad cars to a breaker situated a few miles distant, where it is crushed, screened, jigged and otherwise prepared for market. It is interesting to note that coal from an adjacent underground operation of the company also is prepared in the same breaker and with the same equipment.

Uses Its Refuse Coal for Power Purposes

The Gallup American Coal Co., which has one of the finest mine power stations in the West, is burning the reject of its picking tables under the four 419-hp. Heine boilers by which its steam is generated. About 12 in. below the top of the coal in its mine, Navajo No. 5, is a sandstone band about an inch thick. The coal above this band is dull and sometimes bony. It often has to be removed by the men at the picking table. In that event it is consigned to the crushers where it is prepared for delivery to the Harrington stokers by which the coal is fed to the furnaces. By utilizing the bone in the manner described, the Gallup American Coal Co. is able without undue loss to make a more than usually excellent preparation of its coal for the market.



Rebuttal Witnesses in Lake Hearing Defend Coal Preparation and Ability Of Northern Lines to Handle Traffic

By Sydney A. Hale
Associate Editor, *Coal Age*

Washington, D. C., Nov. 23.—Northern producers, in rebuttal testimony in the final hearings in the reopened proceedings in Docket No. 15007, *Lake Cargo Coal Cases, 1925*, before Interstate Commerce Commissioner Hall and Examiners Gerry and McGrath, struck back yesterday and today at the claims of the Southern rivals that backwardness in coal-preparation methods as well as high wage scales explained the declining share of lake cargo tonnage enjoyed by the operators in Ohio, western Pennsylvania and northern West Virginia.

To further buttress their position, counsel for the complaining interests subpoenaed operating officials of the Northern lines to testify that the roads serving the Pittsburgh and Ohio fields could handle a substantial increase in lake tonnage at costs no greater, and probably less, than those incurred in 1925 and without taxing the physical capacity of the Northern railroads.

Counsel for the Southern carriers and intervening operators of West Virginia and eastern Kentucky hammered away at the wage question as the underlying cause of the difficulties of the Northern operators. Repeatedly they asked how witnesses for the complainants who testified to losses in lake business since 1923 could attribute those losses to the freight rates when relatively and *per se* the lake cargo rate structure had not been changed.

The morning session yesterday was given over to cleaning up loose ends in the defense testimony. J. J. Ekin, comptroller of the Baltimore & Ohio R.R., filed exhibits giving details of property investment and operating expenses of the principal carriers involved in the case to supplement evidence presented at the October hearing. C. C. Morfit, secretary, Tug River Coal Operators' Association, explained the sources of figures filed by him Oct. 30.

James D. Francis, vice-president, Island Creek Coal Co., who had given data on 1925 wage earnings in the non-union fields, added that prior to Nov. 1, 1926, the wages had been on approximately the 1917 scale. Since that date, however, there had been substantial advances. Some districts had gone to the Jacksonville basis. Others in eastern Kentucky and in southern West

Virginia had cut the differential under union rates in their fields one-half to three-fourths.

"How long will these higher rates continue?" asked Commissioner Hall.

Mr. Francis answered that he did not know. The increases, he said, had been made because of labor competition brought about by the British strike and unwarranted panicky buying. The British strike pressure had been removed, with the result that high-volatile mine-run, which sold up to \$6 at the mines for tidewater delivery on Nov. 1, had dropped to \$2.50.

W. A. Weldin, who had been requested by the Commission to extend his studies of tippie equipment to take in all mines in the complaining districts, filed a new series of exhibits on the subject which are summarized in Table I. G. D. Brooke, general manager of the Chesapeake & Ohio Ry., recalled for cross-examination, was interrogated at length on the physical conditions and equipment of the Chesapeake & Ohio-Hocking Valley route to the lakes. E. S. Ballard, counsel for the Ohio No. 8 operators, emphasized that the Brooke estimate of out-of-pocket costs from the Logan field to the lakes included no capital charges, taxes or maintenance other than that apportioned on a usage basis.

"Your estimate," continued Mr. Ballard, "is based on the assumption that all the omitted items will be met

Table I—Comparison of Northern and Southern Equipment*

District	Percentage of Mines Equipped with				Percentage of Mines Shipping More than	
	Mechanical Screens	Picking Tables	Loading Booms		Three Prepared Sizes†	Four Prepared Sizes†
Pittsburgh.....	33.9	33.7	25.2		19.4	6.4
Ohio No. 8.....	37.9	42.4	30.3		28.0	12.6
Cambridge.....	35.3	35.3	35.3		12.0	12.0
Kanawha.....	63.0	52.2	46.0		51.0	26.2
Kenova.....						
Thacker.....	71.9	66.6	49.3		55.0	20.0
Logan.....	77.8	70.5	61.7		66.7	38.9
Hazard.....	79.3	52.3	58.0		67.8	46.7
Harlan.....	81.8	49.2	68.6		74.6	46.3

*Summarized from exhibits filed before the Interstate Commerce Commission in Docket No. 15007 by W. C. Weldin. The percentages used are based upon the number of mines, without regard to capacity, and cover an examination of reports on 234 mines in the Pittsburgh rate district in Pennsylvania and West Virginia, 143 mines in the Ohio No. 8 field, 25 in the Cambridge district, 159 in Kanawha, 69 in Kenova-Thacker, 115 in Logan, 90 in Hazard and 67 mines in the Harlan district. The original exhibits (see *Coal Age*, Nov. 4, 1926, p. 644) included only 76 mines in the Pittsburgh, 62 in the No. 8 and none in the Cambridge district.

†Mine-run not counted as a prepared size.

and borne by other traffic if the line is to earn interest on the investment."

"That is true," replied Mr. Brooke, "but our profits would not be as great without the lake coal traffic."

Foundation for the later testimony on the ability of the Northern carriers to handle more coal was laid by Claire Goodyear, rate expert for the Pittsburgh operators, who was the first rebuttal witness heard. Testifying Monday afternoon, after quoting from the 1923 annual report of the Commission on the exceptional record made by the railroads in that year, Mr. Goodyear offered statements on car supply based upon reports made by the carriers to the American Railway Association.

These statements showed that the Northern lines had been able to fur-

Table II—Tippie Equipment in Pittsburgh District*

	Eastern Division†			Western Division†			Entire District		
	No. of Mines	Daily Rating Cars at‡	Per Cent of Total	No. of Mines	Daily Rating Cars at‡	Per Cent of Total	No. of Mines	Daily Rating Cars at‡	Per Cent of Total
Total mines equipped with	278	3,240.6	100.00	95	1,866.3	100.00	373	5,106.9	100.00
Mechanical screens.....	20	505.2	15.59	46	1,298.7	69.59	66	1,803.9	35.32
Gravity screens.....	111	2,052.4	63.33	49	638.0	34.19	160	2,690.4	52.68
Picking tables.....	27	697.6	21.53	45	1,320.6	70.76	72	2,018.2	39.52
Loading booms.....	20	541.1	16.70	40	1,186.4	63.57	60	1,727.5	33.83
Coal crushers.....	10	449.8	13.88	1	28.4	1.52	11	478.2	9.36
Coal washers.....	7	174.3	5.38	0	0.0	0.00	7	174.3	3.41
Mines without screening equipment.....	148	731.4	22.57	6	39.4	2.11	154	770.8	15.09

*This table, based upon exhibits filed by Claire Goodyear in Docket No. 15007, was offered by the witness to cover all mines in the Pittsburgh lake freight district in Pennsylvania and includes captive mines. The percentage figures used are based upon capacity and not on the number of mines; see Table I.

†These divisions correspond roughly to the gas- and steam-coal mines in the district. The gas-coal group (Eastern Division) includes all mines on the Pittsburgh and Monongahela divisions of the Pennsylvania R.R., Pittsburgh & Lake Erie, Baltimore & Ohio, Monongahela and Washington Run railroads. The steam-coal group (Western Division) includes all mines on the Panhandle division of the Pennsylvania R.R., Montour, Pittsburgh & West Virginia, West Side Belt and Pittsburgh, Chartiers & Youghiogheny railroads.

‡In 50-ton cars.

nish a full quota of cars to the mines much earlier in 1923 than had the Southern roads. He also testified that, notwithstanding the fact that the combined mileage of the Northern lines was more than double that of the Chesapeake & Ohio, Norfolk & Western and Louisville & Nashville, the maximum accumulation of loads on the Northern lines had been only 16,308 cars as against 9,174 cars on the Southern systems and that accumulations on the Northern lines had been consistently less per mile of line.

Lively Tilt Over Equipment

A study of the tippie equipment for all mines in the Pittsburgh lake rate district, offered as complainants' answer to the charges of witnesses Weldin and Morton, provoked lively cross-examination of Mr. Goodyear on trade requirements in preparation and sizing. Mr. Goodyear's major data are summarized in Table II. Witness stated that it was his general understanding that the coals in the gas beds of the Pittsburgh seam were cleaner to start with than the coals in the steam beds and that that explained the smaller percentage of tippie cleaning equipment in the gas-coal division.

This understanding was later corroborated by George S. Baton, mining engineer and operator, who declared that there was not the same demand for sizing of gas coals as for domestic and steam coals. The place to clean Pittsburgh gas coals, he maintained, was at the face. How many men a mine put on the picking tables, he said, was determined largely by consumer complaints on preparation. The efficiency of the work done was a matter of discipline rather than the number of men employed.

Some Old Mines Economical

Mechanical retarding devices, according to Mr. Baton, make adequate preparation with bar screens possible. Age is not necessarily a sign of inefficiency and high costs. Some of the oldest mines, he contended, are the most economically located from the standpoint of purity of seams, ease of working and natural drainage.

F. G. Minnick, general manager of the Pittsburgh & Lake Erie, subpoenaed by the Pittsburgh group, testified that his line could handle 25 per cent more coal than it did in its banner year of 1923 at costs as low or lower than those incurred in 1925. Similar testimony, without definite statement as to percentage increase, was given by F. I. Snyder, general manager of the Bessemer & Lake Erie.

J. L. B. Hornberger, vice-president, Pittsburgh Coal Co.; H. L. Findlay, vice-president, Youghiogheny & Ohio Coal Co., and George W. Oliver, transportation analyst, will be among the principal rebuttal witnesses heard today. An effort will be made to conclude the hearings this evening.

In the account of the *Lake Cargo Coal Case* hearing which appeared in *Coal Age* Nov. 4 it was stated on page 644 that M. C. Meldrim appeared on behalf of the Southern intervenors. This was a typographical error. It should have been W. A. Weldin.

British Strike Comes to Virtual End When Miners' Leaders Abandon Fight For Shadow of National Agreement

Executives of the British Miners' Federation have abandoned their fight for the shadow of a national agreement and have left their followers to make the best district terms the latter can with the coal owners.

This was the outstanding development of the strike negotiations last week. The action, taken at a conference held in London on Nov. 19, followed the rejection of the government peace proposals by a majority of over 100,000. Acceptance of these terms, which included provisions for the setting up of a national arbitration tribunal with limited life and restricted powers, had been recommended to the men by a delegate conference of the Federation the preceding week.

Although the resolution adopted at the sense of the meeting last Friday provides that no final district agreement shall be made until it has been passed upon by the delegate conference, this proviso is considered an empty gesture. The resolution, offered by the South Wales delegation and carried by a vote of 520,000 to 286,000, read:

"That this conference, having considered the whole of the circumstances, recommends all districts immediately to open negotiations with the coal owners in their respective districts with a view to arriving at agreements. The executive committee [of the British Miners' Federation] will be asked to consider what general principles should guide the district organizations in their negotiations. No district shall enter into a final settlement until a further national conference is held to receive reports of all the negotiations."

The surrender of the strike leaders was forced by the continued stream of men returning to the pits. On the day the action was announced over 10,000 men went back to work. This brought the total returned to 376,374, or more than one-third of the total number normally employed at the mines. Dur-

ing the past week nearly 48,000 strikers had given up the struggle and made individual peace with the coal owners.

A. J. Cook, general secretary of the Federation, admitted this situation at the close of the Nov. 19 conference. "I would very much have preferred that the rank and file had been consulted before the decision was arrived at," he said, "but the fact that the men are returning to work influenced the minds of the delegates present and was largely responsible for this decision."

A storm center from the time the strike started on May 2, "Emperor" Cooke, who recently protested that surrender would be a betrayal of the Soviet interests which had contributed \$4,500,000 to the support of the strikers, is again the object of renewed bitter criticism. His leadership has been condemned by many within the ranks of the organization and it is common talk now that his power has been broken.

Reports from the mining districts early this week were that thousands of others were not waiting for the conclusion of the district agreements recommended by the Miners' Federation, but were reporting for work without further delay. In Northumberland the miners have been balloting to determine which of them should get the first jobs, while in the Lothian district the return to the pits is described as a stampede. In Wales and Nottinghamshire many of the miners have broken away from the federation and have signed contracts without consulting union officials.

In some quarters there is interest in the reported division in the Cabinet on the wisdom of proceeding now with the establishment of a national arbitration tribunal for the mining industry. The majority of the Cabinet evidently favors dropping the scheme forthwith, but the minority, said to be led by Winston Churchill, insists that this is the opportune time to assert the government's authority over the mines.



Wide World Photos

British Folk Line Up for Coal Permits

In many districts of Great Britain permits are required to obtain household fuel, this system having been resorted to in order to make a fair apportionment of the limited supply. The above snapshot was taken outside Islington Town Hall.

Sliding Scale Again Urged To Aid Ohio Coal Industry

The special committee of the Ohio Chamber of Commerce named a month ago to investigate the causes and suggest remedies for the recent coal mining depression in Ohio has completed its labors and will make its report and findings soon to the Ohio Chamber. The committee held its last session in Columbus Nov. 19, when representatives of the recently organized Ohio Coal Operators' Association were heard.

N. D. Monsarrat of Monsarrat Bros. presented his plan of a sliding scale for miners' wages on the 60-40 per cent basis. This plan had been announced previously and contained nothing new. He proposed that the miners be paid 60 per cent of the selling price of coal produced, the operators to get the remaining 40 per cent.

Representing the board of directors of the Ohio Coal Operators was George K. Smith, secretary of the Sunday Creek Coal Co., who appeared as spokesman. He attributed the depression to the high wages contained in the Jacksonville agreement, which made it impossible for operators to compete with non-union mines of West Virginia and Kentucky.

Frank E. Ray, a mining engineer of the Ohio State University, who was named some time ago to make a survey of Ohio mining conditions by the federal government, appeared and explained his plan of a sliding scale for mining, also based on the price at which the product is sold.

Chairman Wyer announced that no report would be made public until the Ohio Chamber of Commerce was ready to release the findings of the committee.

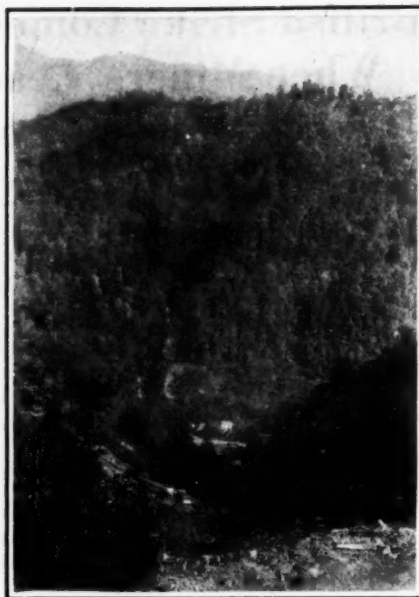
It was intimated, however, that the only solution was a reduction of the wage scale, commensurate with the scales paid in other fields and a revision of freight rates as applied to long and short hauls.

Sunday Creek Buys Mines and Acreage in Hocking Field

The Sunday Creek Coal Co., with offices in the Outlook Bldg., Columbus, closed a deal Nov. 16 whereby it acquires all of the holdings of the New Pittsburgh Coal Co. in the Hocking Valley region, comprising three operating mines and about 3,200 acres of coal lands. The three mines, which have been idle for the past three years are known as Nos. 5, 7 and 9, located at Murray City and Beaumont. The mines have a capacity of approximately 3,500 tons daily and are equipped with modern machinery, including shaker screens and picking tables.

John S. Jones, chairman of the board of the Sunday Creek Coal Co., announces that the mines will be reopened at once and put under full capacity. O. S. Newton, general manager, left immediately to take personal charge of the reopening of the mines.

The New Pittsburgh Coal Co., which is a subsidiary of the Pittsburgh Coal Co., still operates the company's mines in the Pomeroy (Ohio) district and in Kentucky.



View from the Top of the Incline
at Wolfpit, Ky.

Men, material and house coal are transported over this incline. The bottom landing is near the white house in the center of the picture. The spur track at the left leads to the dump of the Lower Elkhorn seam. The faint line at the top of the photograph is the ridge of the Cumberland Mountains, 12 miles distant, which is the line between Kentucky and Virginia.

Railroads Burn More Coal

Class 1 railroads of the United States consumed 8,114,546 net tons of coal in train locomotives during September, 1926, according to the monthly report of the Interstate Commerce Commission. This is an increase of 292,035 over the total for the corresponding month of 1925.

The average cost per net ton, including freight, of such fuel in September last was: Eastern district, \$2.58; Southern district, \$2.11; Western district, \$2.95; United States, \$2.59. The difference in the average for the country as a whole from the preceding month was \$0.02 increase, and from September, 1925, \$0.07 decrease.

Preparing the Sinews for The Advance to Miami?

It has become necessary for the United Mine Workers to raise additional revenue to provide for "future activities," according to an official notice issued by officers of the international union and printed in the *United Mine Workers' Journal* of Nov. 15. To this end an assessment of \$1 per month for December and January has been levied upon the membership.

This action was decided upon, the notice states, at a meeting of the international executive board held at Indianapolis, Ind., on Oct. 27. Local union secretaries are directed to collect the assessment in addition to regular dues.

Complete Negotiations for Franco-German Accord

Paris, France, Nov. 5.—Negotiations started several months ago for the commercialization of deliveries of raw coal and of the relations between German producers and French consumers similar to that existing on metallurgical coals have been completed. The agreement will be submitted to the governments of the two countries for ratification and probably will become effective Dec. 1.

Under the Versailles Treaty Germany was required to make certain deliveries to France until 1930 at German pithead prices, plus rail transport. Subsequent agreements permitted the placing of free-trade contracts as prestations in kind so that France might secure German deliveries beyond 1930.

Since German inland prices have fallen below export prices, France has resolved to resort to commercial contracts to be put down to the "prestations in kind" account and so avoid payment of export prices called for on seaborne shipments. Against this Germany protested and asked for an arbitration of the dispute.

In the meantime negotiations were opened between the Ruhr Kohlensyndikat and representatives of the Office des Houillères Sinistrées (O. H. S.) and Office Prestations en Nature, and the Germans have agreed to the execution of commercial contracts as prestations in kind in consideration of an allowance of 1.15 mk. on raw coal and 1.5 mk. on coke.

Paisley Spurns Union In West Virginia

The Paisley interests, of Cleveland, will not permit their mines in the northern Panhandle of West Virginia to be unionized in order to resume operations at Ohio mines under a union agreement, as demanded by officials of the Ohio mine workers' union. This fact developed at a recent conference attended by J. A. Paisley, and representatives of the Ohio mine workers held in the office of Secretary of Labor James J. Davis at Washington. As an upshot of the meeting Mr. Paisley declared "I was the last operator to break with the union in West Virginia and will be the last to return to a union policy."

The conference was attended by Joseph Arkwright, manager of the Elm Grove Mining Co., who brought back word to Wheeling as to what Mr. Paisley's policy would be. Others attending the Washington conference were Lee Hall, president of the United Mine Workers of Ohio; G. W. Savage, secretary-treasurer of the Ohio miners; John Cinque, president of subdistrict 5, and J. A. Paisley, head of the Valley Camp Coal Co. and subsidiaries.

When the question of permitting three mines of the Paisley interests in Ohio to resume operations under a lease was broached, President Hall of the Ohio union took the stand that the Paisley company could not operate mines in Ohio on a union basis so long as the same interests operated mines in West Virginia on a non-union basis.

Peace Without Betterment Seen as End Of British Strike; National Federation Of Miners Bereft of Bargaining Power

By Paul Wooton

Washington Correspondent of Coal Age

To all intents and purposes the British strike is settled, according to advices reaching Washington. A cablegram received by the Department of Commerce on Nov. 20, however, says: "District voting on the latest government proposals to settle the strike is believed in England to be likely to show a small majority against acceptance, according to preliminary returns. The districts voting against acceptance of the proposals include South Wales, Northumberland and Durham and Scotland."

"The Emergency Act is expected in England to continue for another month but the scope of the emergency regulations depends on the results of a conference of miners' delegates on Nov. 26. Welsh coal-mine owners are urging the immediate lifting of the export embargo. Increasing chartering of tonnage is reported for export within specified periods after the termination of the strike."

Despite the fact that observers here regard the settlement as a decisive victory for the owners, the cablegrams which are being received at the time of this writing indicate that there is much doubt as to their acceptance by many of the operators as well as by some of the districts.

Although the national tribunal which is proposed cannot be considered as more than a sop to labor, some of the owners are so opposed to the principle that they are continuing in their opposition to the settlement. The purpose of the tribunal is to act on the appeal from each district and to incorporate into the district agreements the principles that underlaid the old national agreements. It would have nothing to do with the fixing of hours, but would be charged with certain responsibilities such as adjusting inequalities between districts. It is apparent, however, that the tribunal is simply an effort to give the settlement some semblance of a national character and to save a vestige of the old national agreement. It will, of course, determine certain accounting and technical questions.

It is apparent, however, that the miners have agreed to a settlement which does not square with their slo-

gan of "not a minute more nor a penny less." In every district they will go back to work at longer hours. Thus the seven-hour day, which the miners fought for generations to achieve, has been lost.

In many districts the men will go back to work at lower wages than before the strike began in May. The National Federation has become impotent as a bargaining unit. The industry will be on a district basis entirely. The national tribunal simply is to be the depository of the district agreements. It will have no authority to control but may exercise some influence through the publicity it would command. Rather than deal with the tribunal some operators are threatening to make pit agreements independent of the district.

It is clear that for several years at least the voice of the miners' union will be a feeble one in the determination of affairs pertaining to the coal industry. Its influence has sunk lower than at any time during the past fifteen years.

All of the losses which have been sustained by the public, by the operators and by the miners have brought about nothing fundamental. Nothing has been contributed to the future of the industry. The report of the Royal Commission on the Coal Industry has been cast aside. Nothing has been done to eliminate the inefficiencies that the Commission pointed out. The industry may flourish for a few months until the coal stocks of the United Kingdom and the Continent have been built up again, but it seems apparent that after that the industry must slump into the same position in which it was last spring.

Tremendous Losses Sustained

More than one million miners have suffered for six months. The strike has cost the British people £1,500,000,000, yet nothing has been gained which can be regarded as an asset. No step has been taken to encourage the individual miner to increase his output. Nothing has been done to discourage the operator who wants to conduct coal mining as his grandfather did. Moreover, Germany has annexed permanently some of the important markets once supplied by the British.

Germany has made no effort to expand its production to the point where it could supply all the extra demand created by the British strike. In sharp contrast with developments in the United States the Germans refused to open their uneconomical mines. They confined their production to the low-cost mines. In those properties new efficiencies were attained, but there was no advance of wages. As a result they will not have to go through the throes of the collapse which would have followed expansion to meet all of the temporary demand. Instead the

Smokestack Watchman Cuts Fuel Bill

A smokestack inspector to watch twelve stacks and prevent excess consumption of coal has been engaged by the Union Electric Light & Power Co. of St. Louis at its Ashley St. plant.

The young man who has his observation post in a large window of an old office building about 200 ft. from the power plant has a switchboard equipped with twelve switches and when he notes a chimney pouring forth an excess volume of smoke he immediately presses the switch for that chimney. A light burns on a board in the engine room, and a siren informs the firemen at once that the chimney is off feed. The company has cut its fuel bill since the young man has been on the job.

Germans did much picking and choosing among those who wanted to buy coal. Coal was furnished largely to the customers who were willing to make long contracts and who likely can be retained in the future. As a consequence, the German industry bids fair to be the only one which has attained lasting benefits from this latest upheaval in the tempestuous history of coal production.

It is very apparent that the British must do three things:

(1) Adopt hours of labor at least as long as those observed by the American coal producers.

(2) Rid themselves of rules which force more men on the payroll than are necessary.

(3) Mechanize their mines.

Distribution Census Put Off

No census of distribution, a subject endorsed by several New Orleans trade associations, will be undertaken by the government for more than two years longer, the Budget Bureau having refused to approve an appropriation of \$100,000 for this purpose. Compilation of reports on sales and stocks of major lines of merchandise has been sought by business men in all parts of the country. Particularly has there been such a demand from the South, which has evidenced strong inclinations toward market analyses in order to establish that the prosperity of the section does not depend upon one commodity alone.

It was proposed to launch a census of distribution on a modest scale with \$100,000 for the Department of Commerce, questionnaires to be limited to a few lines of goods and to be handled by the department in connection with its next biennial census of manufactures. With the experience thus gained, it had been hoped to develop a more complete census of goods sold and in stock thereafter, with a request for a special law to enable the Census Bureau to undertake the work. The limited program first planned could be carried out without a special law, as an extension of the census of manufactures.

EDITOR'S NOTE—The foregoing Washington letter reflects certain views of official Washington. Due to the fact that policy as a rule prevents government officials from permitting their views being quoted directly, the authority for these reports is necessarily somewhat vaguely referred to. The views reflected are not those of any one group of officials, but of different men, in the legislative and executive departments. There is no necessary connection between their views and COAL AGE editorial policy; neither do they necessarily represent Mr. Wooton's personal views. It is felt that the opinions thus faithfully reflected will be of great interest to the industry. Where opinions are cited from sources outside of the government, the source will be specifically stated.

Bureau of Mines Reports

Advances in Rock-Dusting And Other Safety Measures

Continuation of the educational campaign designed to decrease the death and injury rates among the million miners of the United States was the predominant feature of the activities of the U. S. Bureau of Mines during the fiscal year 1926, the first year in which the Bureau functioned under the Department of Commerce. Substantial progress was achieved in the movement for the rock-dusting of bituminous coal mines as a preventive of explosions, a great number of the larger mines having adopted this safety measure.

The Bureau continued its intensive efforts in the teaching of safety to the miner. During the year 28,041 miners were trained in first-aid and mine-rescue methods, an increase of 3,866 over the number trained in the preceding year. Since the beginning of this work the Bureau has instructed nearly 200,000 miners, and has also given safety instruction to many city firemen, policemen, boy scouts, pupils in public schools, and the wives and children of the miners.

Mine-safety studies were continued in the experimental coal mine at Bruce-ton, Pa., the only coal mine in the world devoted exclusively to government safety research. Tremendous explosions of coal-dust are frequently staged at this mine and vivid demonstrations of the efficiency of rock dust for limiting or preventing such explosions are given. Co-operation was continued with the Mines Safety Research Board of the British Mines Department at the Bureau's experiment station at Pittsburgh and in the Eskmeals experimental gallery in England. A new type of gas mask, devised to afford protection in air against all gases, vapors and smokes, was developed.

Can Talk with Entombed Miners

Studies recently completed by engineers of the Pittsburgh experiment station have demonstrated that voice signals can be transmitted in and out of a mine, through more than 400 feet of strata, by the use of dry cells as a source of electrical energy and of modified telephone parts as receiving and sending apparatus. The development of practical means of communication between miners entombed after mine fires and explosions and rescue parties on the surface would naturally be of the greatest aid in the conduct of mine-rescue operations.

A carbon monoxide recorder developed at the Pittsburgh station has given excellent service in a number of fields. This delicate instrument gives warning of the presence of this deadly gas in tunnel atmospheres of four parts in ten thousand parts of air, and indicates much lower concentrations. A new method of measuring the rate of detonation or speed of an explosive has been developed by the Bureau, in which a photograph of a detonating column of explosive is taken on a rapidly moving film.

The Bureau continued its study of the causes of mine fires and explosions, furnishing reports to the mine opera-

Hoover Urges Continued War on Waste in Industry To Raise U. S. Living Standards

There must be no abatement of efforts to eliminate waste in industry if there is to be further improvement in the material condition of the people of the United States, in the opinion of Herbert Hoover, Secretary of Commerce.

Quoting preliminary excerpts from his annual report, he said that all industry should continue to make better utilization of resources and efforts and listed some of the improvements which he said had been effected in the five years since elimination of waste in industry has been stressed.

The objectives underlying the campaign, he continued, "have but one purpose—to maintain American standards of living for both workers and farmers and to place production on a more stable footing by enlarging consumption and export markets through reduced production and distribution costs."

"The high standards of living enjoyed by the American people are the result of steadily mounting per

capita production," he said. "There is only one way further to advance those standards and that is by improved methods and processes, by the elimination of waste in materials and motion in our production system."

The major directions for national effort in the campaign, on which progress has been made by the industry with the aid and direction of the Commerce Department, he listed as improved rail transportation, increased use of hydro-electric power and use of water resources for cheaper transportation, flood control and reclamation; enlarged electrification of the country for the saving of fuel and labor, reduction of the waste occasioned by booms and slumps in the "business cycle," with their intermittent waves of unemployment and bankruptcy, and the reduction of seasonal variations of employment in construction and other industries; encouragement of pure and applied scientific research and the development of co-operative agricultural marketing methods.

tors following investigations of disasters at their mines. Investigations on the use of electrical equipment in mines and the use of flame safety lamps and gas-detecting apparatus were continued. The Bureau's "permissible" list now covers virtually every line of activity for which equipment is used in underground coal mining. Manufacturers are giving more attention to the designing of permissible mining machinery, and the Bureau looks forward to the time when operators will be able to equip their mines completely with apparatus that has been tested and listed as permissible.

The Safety Extension Service was established during the year. Its chief functions are to bring before the industry the Bureau's recommendations on rock-dusting bituminous coal mines, the use of closed lights, advanced mine-rescue training, mine safety organization, and the purpose of the Holmes Safety Association; also to conduct field demonstrations of the explosibility of coal dust and the use of rock dust as a preventive of mine explosions. The Joseph A. Holmes Safety Association, named in honor of the first Director of the Bureau of Mines, has among its members thousands of miners who are making special efforts to advance safety in mining. During the year 30 new chapters were organized—13 in Pennsylvania, 11 in Alabama, 2 in Wyoming, 2 in Kansas, 1 in Missouri, and 1 in Oklahoma.

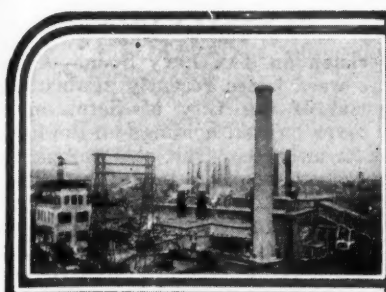
Chemists at the Pittsburgh experiment station have developed a new respirator which is believed to be superior to other devices as a means of protecting wearers from injurious dusts encountered in mining and other industries. Studies conducted in co-operation with the U. S. Public Health Service and the American Society of

Heating and Ventilating Engineers are affording information relative to temperatures and air-movement conditions which afford the best safety and efficiency conditions in mines and factories. Sanitary surveys of mining towns in various parts of the country have been made by Public Health Service officials attached to the staff of the Bureau of Mines. A study of the serious problem of pollution of streams by waste waters from mines is being conducted.

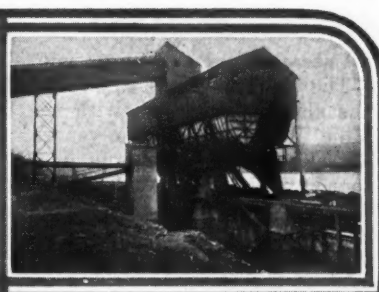
As the result of studies by Bureau engineers, definite increases in the production of lump coal in mines have been attained through more efficient use of explosives. The use of liquid-oxygen explosives in the mining and quarrying industries has been investigated.

The Bureau continued its studies looking toward the more efficient utilization of fuels in industrial plants and in homes. Problems of this nature studied included refractories in boiler furnaces; the clinkering properties of coal; pulverized coal for marine boilers; properties of coke; coal washing; boiler water conditioning, and the spontaneous combustion of coal. Studies are being undertaken looking toward the catalytic conversion of coal, through water gas, to methanol and other organic compounds and mixtures suitable for motor fuels and other public needs.

With the transfer of the Bureau to the Department of Commerce, an Economics Branch was established for the study of economic problems in the mineral industries. This new branch is giving attention to the uses of coal, coal reserves, prices, distribution, consumption, stocks and marketing. A statistical analysis of strikes and lock-outs in the coal-mining industry during the past 75 years has been made.



News Items From Field and Trade



ALABAMA

New Johns Washery Going Up.—The Black Diamond Coal Mining Co. has begun construction of a new washery to replace the one recently destroyed by fire at its Johns Mine. The new structure will be a four-jig plant of the Elmore design with a daily capacity of about 1,000 tons. In the meantime the Johns and Adger mines of the company are idle. The plant will be completed about Jan. 1, 1927.

State Coal Dock for Mobile?—The Mobile Chamber of Commerce has been asked by General W. L. Sibert, chairman-engineer for the State Docks Commission, for all information available on the port's prospective tonnage of both export and bunker coal with the view of erecting a modern state-owned coal terminal. The docks board is making other investigations and there seems a reasonable prospect of the commercial success of a state-owned coal plant.

New officers of the Joseph A. Holmes Safety Association recently elected are Harold McDermott, New Castle Coal Co., president; L. E. Geehegan, Gulf States Steel Co., vice-president, and H. E. Mills, assistant secretary of the Alabama Mining Institute, secretary. The association is mapping out plans for an active safety campaign through its locals in the coal mining camps during next year.

COLORADO

Making Mine-Labor Survey.—A survey of coal mine labor in Colorado will be made by Paul H. Moncure, special agent of the federal bureau of labor statistics, who arrived in Denver from Washington, D. C., recently. The study will deal with the number of hours the miners work and their wage scales. When he has finished his survey of the coal mining industry in Colorado Mr. Moncure will proceed to Kansas to continue the work.

ILLINOIS

Confirms Sale of Standard Mines.—The U. S. District Court at Danville recently confirmed the sale made on Sept. 14 to the properties of the Standard Coal & Coke Co., including the Scranton and the Orchard mines in Williamson County east of Marion and near Pittsburg. They were sold under federal receivership for \$50,000 to Harvey M. Howett, Lorenzo Becker and Barton E. Buckner as a reorganization committee. It is understood that the new company organization that will operate them is the Charter Coal Co.

which has given the mortgage to the Chicago Trust Co., Chicago. According to the records of Williamson County the Charter Coal Co.'s Chicago office is at 37 W. Van Buren St. It is understood that the mines will resume operation within the next few weeks.

After having been closed for two years, the Meek and OK mines at Marissa, are about to be reopened. Both mines have been leased to the Wallace Coal Co., St. Louis. The two mines will give employment to 250 men. The other mines at Marissa resumed work several weeks ago.

The Odin coal mine, ten miles northeast of Centralia, resumed operations Nov. 8 with about 250 men. The mine was idle for seven months.

The Taylor coal mine near Springfield was damaged \$20,000 Nov. 5 when the tippie and all structure above ground suddenly fell into the main shaft.

The annual banquet of the Chicago coal trade will be held Jan. 20 at a place in Chicago yet to be selected. Coal men from all parts of the country are expected to attend. The meeting will be under the auspices of the Chicago Coal Merchants' Association.

The C. G. Blake Coal Co. has moved its offices in Chicago from the Lytton Building to the new Straus Building.

A. D. Lewis, of Springfield, director of the Department of Mines and Minerals of Illinois, announces the following itinerary of the Illinois Miners' Examining Board for next month: Dec. 6, Belleville; Dec. 7, Harrisburg; Dec. 8, Herrin; Dec. 9, Johnston City; Dec. 10, Duquoin; Dec. 11, Centralia; Dec. 13, Staunton; Dec. 14, Springfield; Dec. 15, Taylorville; Dec. 16, Danville, and Dec. 17, La Salle.

Long Shutdowns End.—One of the Lumaghi mines started to hoist coal on Nov. 13 after having been idle for three years. It employs 250 men. The other Lumaghi mine has been operating continuously on a part-time basis. Mine No. 17 of the Consolidated Coal Co., at Collinsville, started work Nov. 15. It had been down for two and a half years. Preparations also have been made to open the No. 2 mine of Donk Brothers Coal & Coke Co. at Maryville, while the Donk Mine No. 4, at Thermal, will increase from 2 to 3 days a week to 4 and 5 days a week.

Announcement was made at Pershing, near West Frankfort, that Old Ben Mine No. 15 resumed work last weeks. This operation, which had been closed three years, formerly employed more than 500 men.

INDIANA

As a result of surveys which recently have been completed in Indiana by the geology division of the State Conservation Commission, it is reported that the presence of three beds of coal was established in Dubois County.

The Dominion Mines Co., a Terre Haute corporation, has increased its capital stock from 7,000 shares of no par value stock to 7,500 shares of no par value and \$400,000 of preferred stock.

A high-tension line to the Globe coal mines, seven miles south of Petersburg, is being installed by the Interstate Public Service plant at Petersburg. The company will supply the mine with light and power for its machine shop, tippie and pumps. Several other coal mines in Pike County are using power from the same company.

KENTUCKY

Ryley Acquires New Property.—The C. L. Ryley Coal Co., Lexington, controlling a large output in the Hazard field, has announced through Col. C. L. Ryley, president, the purchase of the Montgomery Creek Coal Corporation property and equipment, on Carr's Fork, in Perry County. This mine, which will be operated as No. 2 of the No. 4 Superior Coal Co., works the No. 4 Hazard seam. The new owners plan to increase the production of the Montgomery plant, installing new machinery for improved preparation. With this addition the Ryley interests have six mines, including also the New Duane, Storm King, Trace Fork, No. 4 Superior and Happy Coal mining companies, each under a separate corporation, of which C. L. Ryley is president; C. Reginald Ryley, vice-president, and Harry C. Howes, general manager. Stock of all of the operating companies is owned by the C. L. Ryley Coal Co., which has the same officials, with the exception that the latter company has Guy H. Sowards as vice-president in charge of sales.

The Monroe Coal Co., at Powderly in the western Kentucky field, is producing coal at a new stripping operation, having started shipping the latter part of October. Indiana capital is reported to be behind the new company.

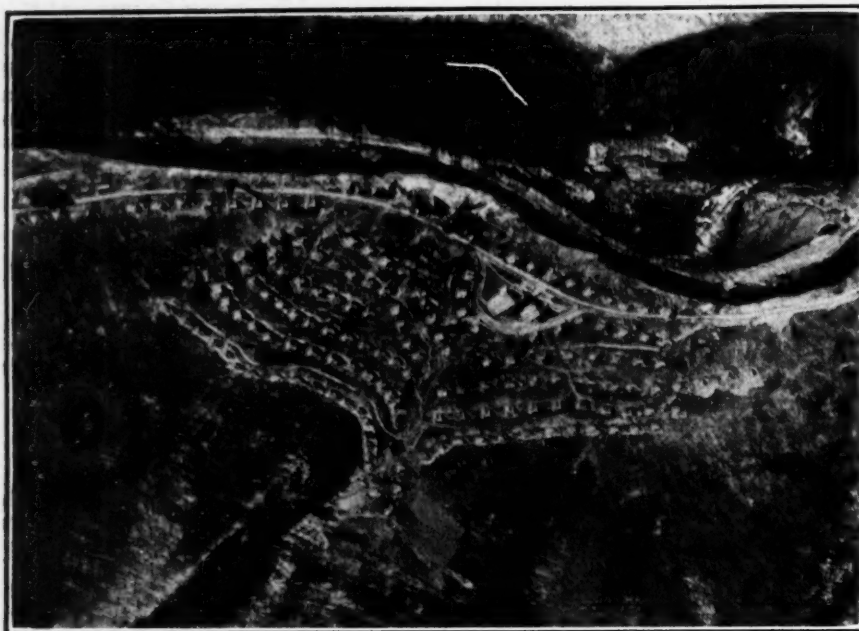
The Brown Coal Co., Memphis, with mines in western Kentucky, recently moved its Louisville sales offices from the Speed Building to 966 Starks Building. The latter building is becoming a jobbing headquarters, about ten coal organizations now having offices in the building.

MONTANA

Cascade Coal Co. Signs with Union.—The Cascade Coal Co., on Deep Creek, has signed a contract with the United Mine Workers for two years. S. W. Gebo, M. J. Cozzens and J. W. Gebo represented the company and Stephen Fontella acted for the union. Stephen Ely, president of the Montana Federation of Labor, and J. E. Winsby, president of the Cascade Trades and Labor Assembly, also were present at the signing of the scale, which fixes wages in accordance with those now in effect in District 27 (Montana). Twenty-five men are now employed at the mine, but the owners are said to intend increasing the force to approximately 400 as soon as preparations can be made for

twenty years Cincinnati has looked for these changes to relieve the strain on "the neck of the bottle." Mr. Lee's announcement came with peculiar significance inasmuch as it has been the Pennsylvania Lines that have been accused of being the obstacle that held the improvement back. He also said the Pennsylvania would come in with its one-seventh toward building a new \$27,000,000 passenger station for the city.

Directors of the Campbell's Creek Coal Co. have decided to leave the presidency, which was rendered vacant by the death of Col. E. O. Dana, unfilled until the regular meeting of the stockholders in February. R. P. Gillham, long the vice-president, will take care of the office.



Ittman, a Village of the Pocahontas Fuel Co., as Seen from the Clouds

The mine, where the men work who live in this village, produces from 1,500 to 2,000 tons daily. The commissary and office buildings in a semi-circular plot near the center of the illustration are noted for their attractive appearance.

increasing the output. The company has 2,000 acres under lease and holds options on 60,000 additional acres in the Deep River section.

OHIO

W. E. Lama, formerly with the Brush Fork Coal Co., of Columbus, who had been out of the business for about eight months, has organized the Capital Coal & Coke Co., and has opened a general jobbing business in the Atlas Building. Associated with him is W. H. I. Tague.

Better Rail Facilities for Cincinnati.—Increased terminal facilities for Cincinnati have been promised through an announcement made by Ivy Lee, press agent of the Pennsylvania R.R., speaking before the Forum of the Chamber of Commerce. He said that his company alone would spend \$5,000,000 for trackage changes. The Big Four is enlarging its Riverside yards and will double the capacity of the Sharonville yards. The Chesapeake & Ohio has under contemplation another bridge across the Ohio River with a cut-off around the city that would give a direct route out of the congested traffic for its heavy freight. For nearly

Hall Hopes to Hold Present Scale.

Lee Hall, president of District No. 6 of the United Mine Workers, which include the state of Ohio, is very much encouraged over the outlook for retaining the Jacksonville wage scale when the present agreement expires April 1. He has been making talks in various mining sections and is working up enthusiasm for the miners' side of the controversy. He says that more miners are now employed in Ohio under the Jacksonville scale, which provides for a minimum of \$7.50 for day work, than at any time since the scale was adopted. Mr. Hall reports that union miners who left their homes to work in the non-union operations of West Virginia and Kentucky are returning to their homes.

The annual meeting and banquet of the Cincinnati Coal Exchange may be moved up to take the form of a Christmas part. This year that function will be held at the Hotel Alms on Dec. 21 and whether the annual meeting in January be held is still a moot point. R. A. Colter, former president of the Exchange, was appointed a committee of one to name candidates for directors. Six will be named and three chosen.

PENNSYLVANIA

Decision on Tax Levy Soon.—Arguments were heard recently against the proposal of the City of Scranton to levy taxes on coal holdings on the basis of \$800 an acre. The coal companies united in opposition to the valuation and offered the testimony of Frank Hemelwright, formerly a high official with the Temple Coal & Iron Co., to attack the valuation. Mr. Hemelwright said a fair valuation on the coal property should be \$300. The coal companies have not paid taxes for more than a year due to the dispute over the city's valuation. An outside judge was agreed upon to hear evidence in the case. An early decision is expected.

A timber fire which broke out recently in the north counter workings of the Buck Mountain Coal Co., at Gowen, near Hazleton, raged for several hours before it was brought under control. The coal company managed to confine the blaze to timber work in the mine, it has been announced. Whitedamp formed after the fire started and five men narrowly escaped being overcome.

Replacing Burned Breakers.—Two anthracite breakers are being erected in the Mountain Grove region. Both are to replace buildings destroyed by fire. The plant of the Scotch Valley Coal Co. will be ready for use about Dec. 1 and that of the Tip Top Coal Co. in the spring, company officials declare. The breaker of the Buck Mountain Coal Co., at Gowen, just built has begun operation with more than a hundred men on the payroll.

Preparing More Pittsburgh Mines.—The Pittsburgh Coal Co. is preparing to reopen two more mines in addition to the fourteen now in operation in the Pittsburgh district. One of these, it is believed, will be Essen No. 3, at Presto.

Oliver No. 3 Electrified.—Electrification of Oliver No. 3 plant of the Oliver & Snyder Steel Co., at Oliver, has been completed at a cost of approximately \$150,000. Contracts recently closed are expected to keep the company's three plants on full time for an indefinite period. A large number of additional miners also will be employed.

Punxiana Mines Sold.—Two mines of the defunct Punxiana Coal & Coke Co. were sold at Indiana, Pa., on Nov. 16, at receiver's sale. The Isabella mine, near Mecco, was bought by M. Bennett & Sons for \$15,000, and the Juneau mine, by D. F. Rinn for \$9,000.

VIRGINIA

Will Develop Near Doran.—The R. W. Shreve farm, consisting of 448 acres near Doran was acquired at auction recently by J. N. Harmon, secretary and representative of the Coal Creek Coal Co. and the Coal Mountain Mining Co., whose lands adjoin the farm on the north. The price paid was \$51,500, according to Harmon, who said that the purchasers would build a standard gage railroad about two and one-half miles from Doran up Mud Lick Creek, which will develop about 10,000 acres of coal land.

WEST VIRGINIA

Expand Guardian Holdings.—The Guardian Coal & Oil Co. announced last week that it had purchased 321 acres of land adjoining its properties in Webster County. The land owned now covers 7,700 acres and is three miles long and five miles wide at its widest point. The company's first mining unit has gone into production with an initial output of approximately 200 tons of Eagle coal daily.

N. & W. Coal Loadings Heavy.—A new weekly record for coal loadings was established by the Norfolk & Western Ry. during the week ended Nov. 13, when 19,822 cars were filled. This figure exceeds by 391 cars the previous high record week, which was established for the seven-day period ending Oct. 30, when 19,431 cars of coal were loaded.

To Publish Coal Study.—The mining engineering department of the University of West Virginia is making a study of mining conditions in the state with the idea of publishing the information and data so obtained in a pamphlet to be issued by the department, the first of its kind in the state. The work is being done by Harry G. Kennedy and Ivan A. Given.

Weirton Terminal in Use.—The Hillman Coal Co., operating mines on the Monongahela River, was the first to dump coal into the new terminal completed by the Weirton Steel Corporation at Weirton as a part of its \$20,000,000 expansion program. This terminal is considered one of the most modern and is expected to add 1,000,000 tons annually to volume of transportation on the Ohio River.

Glendale Coal Dock Started.—Preparations for the construction of a \$100,000 dock and terminal near Glendale, on the Ohio River, are being made by the Valley Camp Coal Co. Excavating along the river bank has been started. The company's application to the War Department for a permit to construct the terminal calls for a coal tipple and landing dock.

More than five thousand men on the payroll of the Pocahontas Fuel Co. in West Virginia and Virginia have been brought within the protection of health and accident insurance taken out by the company. The contract, which will cost annually about \$100,000 in premiums, is to become effective on Dec. 1.

Dr. J. L. Sameth, of Welch, has sold to A. Z. Litz, of Tazewell, 400 acres of coal land in McDowell County. The consideration was not announced. The land is underlaid with No. 3 and No. 4 Pocahontas coal.

Sales offices of the Consolidation Coal Co. at Frostburg, Md., and at Cumberland, Md., have been closed and the business formerly transacted at those places will be handled hereafter through the Fairmont sales office, which was opened about one year ago under the direction of Chester C. Shinn.

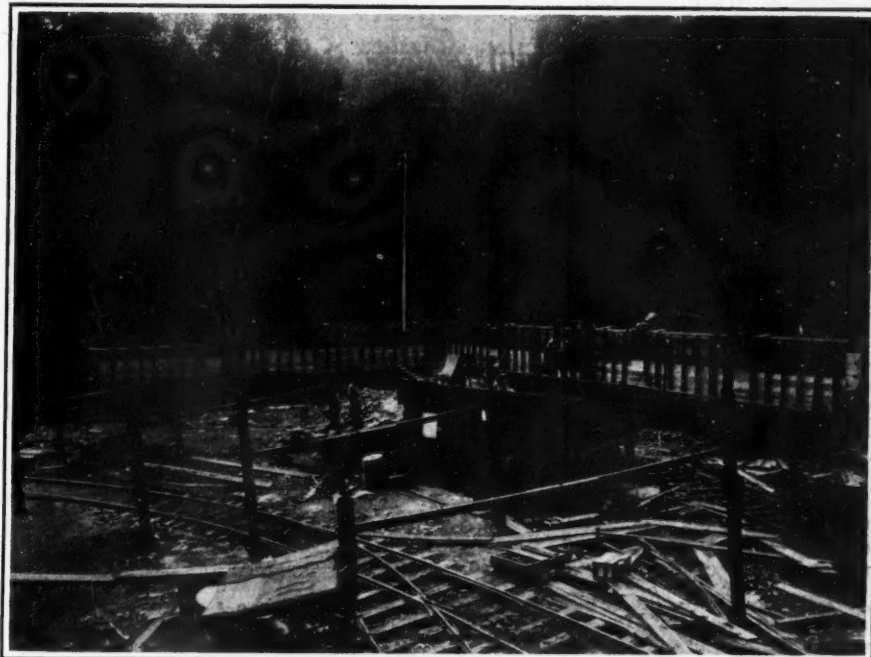
Equipment for Engineering Study.—A device for the purpose of crushing and storing coal and handling ashes is being built at the University of West

Virginia for the benefit of students of engineering. The equipment, which will cost \$15,000, includes a steel hopper with a capacity of 50 tons of coal and 10 tons of ashes, a crusher to reduce the coal to a uniform size and a screw conveyor to remove ashes and facilitate the weighing of coal.

Polar Mine Changes Hands.—Recently chartered, the Corwin Coal Mining Co. has taken over the Polar mine property at McWhorter, W. Va., formerly owned and operated by the National Coal Mining Co. of Pittsburgh. Under the terms of the contract the new company secures a ten-year lease on the Redstone coal on McKinley's Run,

fixed by the assessor or to reduce the assessments in three districts of the county to the extent of about \$6,000,000. Thereupon the coal companies appealed to the Circuit Court.

Judge I. C. Hendon of the Circuit Court of McDowell County has entered a decree in the receivership of M. S. Taylor and W. C. Taylor against the Pan Coal Co. The court gives the defendant company fifteen days in which to pay off judgments to the amount of about \$75,000. If the judgment is not paid the special commissioners, James A. Strother and Jess Easley, are directed to advertise the property for sale by giving 30 days' notice.



New Construction at Pruden, Tenn.

This building, which is 40 x 80 ft., with a 20 x 36-ft. wing for a blacksmith shop, will house a machine shop, warehouse and substation. It is near the portal of No. 2 mine of the Pruden Coal & Coke Co. The back wall of concrete will be 12 ft. high, and on top of this will be a row of windows. The remainder of the building will be of steel of standard sections. On the roof and sides a non-galvanized copper-bearing steel sheet will be used. On this a coat of lead is applied before shipment. In the machine shop will be three tracks with one large pit under all. Two 200-kw. converters will be installed in the substation.

Clay Lick Run, Jesse Hughes run and adjacent points in Harrison and Lewis counties. The Corwin company will pay a royalty of 10c. a ton, two-thirds of which will go to the estate of the late Mrs. Gertrude Howell, or a minimum of \$4,000, and in addition there is to be a 6c. per ton royalty to be paid to the National Coal Mining Co. and its assigns or a minimum of \$2,400 per year.

Paisley Tax Claim Disallowed.—In passing upon a claim for reduction of tax assessments by the Morgantown Gas Coal Co., the Cochran Coal & Coke Co. and the Connellsville By-Product Coal Co., Judge A. G. Hughes of the Preston County Circuit Court, acting as special judge in Monongalia County, has held that the petitioning companies are not assessed at a higher rate than other companies in contiguous territory. The companies named appealed from the tax valuation made by Assessor Henry to the Monongalia County board of equalization and review, that tribunal declining to alter the assessments

CANADA

In view of the activity in the coal industry the pier at Louisburg, N. S., is being repaired and put into condition to handle a large tonnage during the winter. For the last few years little shipping has been done from this port during the winter, but this year a busy season is anticipated.

Drive New Dominion Shaft.—The new shaft at colliery No. 23 of the Dominion Coal Co. of Sydney, N. S., has been completed. The shaft, which is circular, with a diameter of 13 ft. 6 in., was sunk 560 ft. in five months and concreted as it went down, and the work was not attended with any accident. The Gardner seam, which will be worked, was found at that point to be 4 ft. 2 in. thick, the upper six inches close to the roof being cannel coal. The longwall system of mining will be used. As soon as the busy season is over sinking will begin on the main hoisting shaft.

Among the Coal Men

Charles A. Moffett, president of the Gulf States Steel Co., Birmingham, Ala., since 1921, and connected with the Southern Iron & Steel Co., its predecessor, since 1909, has resigned because of ill health. Leslie Geohegan, general manager of the company, has been elected operating vice-president, the vacancy as chief executive not having been filled as yet.

George S. Ward, assistant secretary of the Harlan Coal Operators' Association, Harlan, probably will be named sheriff of Harlan County, Kentucky, by Judge W. J. Howard, who has been given permission to name the sheriff, as a result of the Court of Appeals having thrown out the 1925 election, on the ground that it was illegally held, and that neither of the claimants to the office was entitled to it. The Judge has indicated that Mr. Ward will be named.

Governor Pinchot has appointed three delegates to represent Pennsylvania at the twenty-ninth annual convention of the American Mining Congress to be held at the Mayflower Hotel, Washington, D. C., Dec. 7 to 10. They are Clay F. Lynch, general superintendent of the H. C. Frick Coke Co., Scottdale; Philip Murray, vice-president of the United Mine Workers, and Thomas Kennedy, secretary-treasurer of the United Mine Workers.

Harry B. Scott, of Philipsburg, a well-known operator in the central Pennsylvania field and a member of the board of directors of the Central Pennsylvania Coal Producers' Association, was elected to the Pennsylvania State Senate on Nov. 2 on the Republican ticket. The district includes Clearfield and Center counties. Mr. Scott a few years ago served several terms in the Pennsylvania House of Representatives.

J. W. Bischoff, of Elkins, W. Va., who for several months has been acting division superintendent of the northern division of the West Virginia Coal & Coke Co., has been appointed as division superintendent. He has general supervision over the mines of the coal company at Mabie, Norton, Coalton, Harding, Bower and Junior, all of which are in active operation at the present time. Mr. Bischoff has been connected with the West Virginia Coal & Coke Co. for a number of years.

E. D. Clark has resigned as superintendent of the Mulga mine of the Woodward Iron Co. and is now assistant superintendent of the Flat Creek division of the Alabama By-Products Corp. His headquarters are at Quinton, Ala.

W. R. Gray, a prominent coal operator and business man of Mount Hope, W. Va., is confined to his home at that place following a hemorrhage of the lungs. No grave danger is apprehended but Mr. Gray will be incapacitated for business for a while.

E. H. McCleary, formerly general mine superintendent of the Alamo, Oak-

dale and Barbour coal companies in Colorado, has been made general manager of the operating department of the Sunnyside Coal Co., with headquarters at Strong, Colo.

Patrick McDermott, of Cambria County, an organizer of the United Mine Workers and active in union affairs in the district, was defeated for re-election to the lower branch of the Pennsylvania Legislature on Nov. 2. He had served several terms. He was nominated by the Democratic, Labor and Socialist parties, but ran more than a thousand behind his Republican opponent.

W. B. Talbott, formerly secretary-treasurer of the Phoenix Fuel Co., Louisville, Ky., who recently sold his interest in that concern, has gone with R. W. Hunter, in the Groveland Coal Co., Louisville, as a buyer and salesman. He spent part of the past week in the southeastern Kentucky coal fields.

Louis Fabbri has rejoined the staff of the Southern Coal Co. in Chicago. He formerly was with the Kirkpatrick Coal Co., which concern has closed its Chicago office.

Industrial Notes

The Ohio Brass Co. established new quarters for its San Francisco and Los Angeles branch offices on Nov. 1. The new address of the San Francisco office is 531-533 Matson Building, 215 Market Street. The Los Angeles office location is 508 Subway Terminal Building, 417 S. Hill Street. In both of these cities the company will carry ample stocks of its various products for the convenience of the Western trade.

The rubber products division of the du Pont Company states that there has been a steady increase in the use of Ventube and other flexible canvas tubings treated with rubber in mines during the past few years. In 1923 approximately 407,000 ft. of such tubing was used in mining; in 1925 the amount had reached approximately 486,000 ft. and for 1926 it is estimated that 500,000 ft. will be used.

The Westinghouse Electric & Mfg. Co. has opened an electric service and repair shop in Fairmont, W. Va., primarily for the purpose of taking care of work supply and repair work in the local field. Formerly the closest Westinghouse service shop was in Pittsburgh, Pa. The Fairmont plant is in charge of R. M. Bayle.

E. LeRoy Harrington, well-known clamshell bucket engineer and designer, is now a member of the Blaw-Knox organization, Pittsburgh, Pa. His broad experience will be used particularly in developing special buckets for use in steel mills, blast furnaces, at ore and coal docks, and elsewhere.

Traffic News

Williamson Operators Protest Refusal of Joint Rates

The Operators' Association of the Williamson Field has filed complaint against refusals on the part of the Baltimore & Ohio and Pennsylvania railroads to enter into joint through rates on bituminous coal with mines on the Norfolk & Western to points in the District of Columbia, Maryland and Virginia. The traffic is subjected to the application of full combination rates. This is held to be unduly discriminatory, unduly prejudicial and preferential of competitors located in the Kanawha group. The establishment of just, reasonable and non-discriminatory rates is asked.

The Island Creek Coal Co. has filed a complaint with the Interstate Commerce Commission against a rate of \$3.02 on coke from Ashland, Ky., to Holden, W. Va. The distance is 94 miles. The rate is unreasonable, the company contends, to the extent that it exceeds \$1.51, which is the rate which applies in the reverse direction.

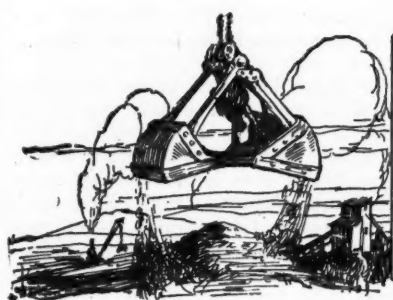
Freight rates from Utah mines to West Yellowstone are declared prohibitive by J. F. Coy, of Idaho Falls, Idaho. He has asked the public utilities commissions of Utah, Idaho and Montana to intervene, although it is really a matter for the Interstate Commerce Commission.

The Syracuse (N. Y.) Chamber of Commerce and Manufacturers Association have filed a complaint with the Interstate Commerce Commission against rates on bituminous coal from mines in Pennsylvania and West Virginia. The establishment of reasonable rates is asked.

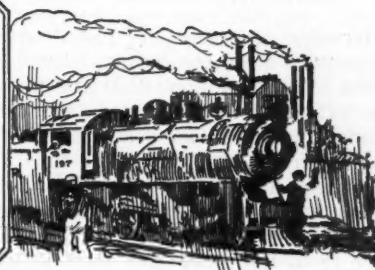
Association Activities

The annual meeting of the Harlan County Coal Operators' Association, held at Harlan, Ky., on Nov. 17, with every member present, in addition to a large number of guests, including representatives of the Pennsylvania, Louisville & Nashville, Monon and Big Four railroads. An unusual feature was a speech by T. J. Smith, an organizer for the United Mine Workers. W. A. Ellison was re-elected president; L. P. Johnson, vice-president; E. R. Clayton, secretary; George S. Ward, assistant secretary, and Roy Carson, traffic manager. The new executive board consists of R. W. Creech, S. J. Dickenson, Elseo Guthrie, R. E. Lawson, John Marland, F. D. Perkins, J. C. Stras, J. B. Torbert, R. C. Tway, A. F. Whitefield, Jr., and H. C. Williams.

The Southern Appalachian Coal Operators' Association held its annual meeting Nov. 19 at Knoxville, Tenn., with all the members in attendance. J. E. Butler, general manager, Stearns Coal & Lumber Co., Stearns, Ky., succeeds C. W. Henderson as president, and C. M. Moore, Knoxville, and H. C. Williams, Middlesboro, Ky., were elected vice-presidents.



Production And the Market



Fading Opposition to Peace at British Mines Again Depresses Eastern U. S. Prices

The collapse of organized opposition to a settlement of the British strike took further toll of prices in the Eastern bituminous markets of the United States last week. Declines ranged from a minimum of 25c. on smokeless lump in Columbus to \$2.25 on high-volatile coals at the Hampton Roads piers. At the same time the rising demand for domestic sizes of Middle Western coal created a surplus of screenings in Illinois and Indiana and weakened prices in two of the districts in those states.

Aside from this softer tone to screenings general price levels in the Middle West were firmly maintained. With few exceptions, however, the story of prices in the Appalachian Region was an unrelieved tale of falling quotations in which no producing district or marketing center escaped. Alabama, perhaps, was the most successful in resisting the downward trend—largely because advances in that section, as in the Middle West, have rested more on local demand than on developments in the export trade.

Other Factors Also Contribute

The high rate of weekly production and the waning lake trade also have contributed to what may easily become a price débâcle. A new high mark for bituminous output was set during the week ended Nov. 13, when the output was estimated by the U. S. Bureau of Mines at 13,756,000 net tons. This

brought the cumulative total for the year to 487,759,000 tons, as compared to 496,136,000 tons in 1923 and 484,774,000 tons in 1920. While there is some doubt whether the daily averages of the last month can be maintained much longer, loadings on Nov. 15 and 16 indicated that output for the week ended last Saturday would be over 13,000,000 tons.

The lake trade, which has piled up a total tonnage greater than any year since 1923, has only a few days longer to run. During the week ended Nov. 21 there were 656,153 tons of cargo and 32,166 tons of vessel fuel dumped at the lower ports. This made the season's total to date 27,951,389 tons, as against 26,490,591 tons for the corresponding period last year and 23,308,350 tons in 1924. The 1923 total for the corresponding period was 30,578,814 tons.

Average Spot Prices Decline 38c.

Coal Age Index of spot bituminous prices on Nov. 22 was 243 and the corresponding weighted average price was \$2.94. This was a loss of 32 points and 38c. in one week. Compared to the high point of 299 and \$3.61 on Nov. 8, the decline was 56 points and 67c. if the usual jam which follows the closing of navigation occurs this year, the probability is that there will be further declines in price levels.

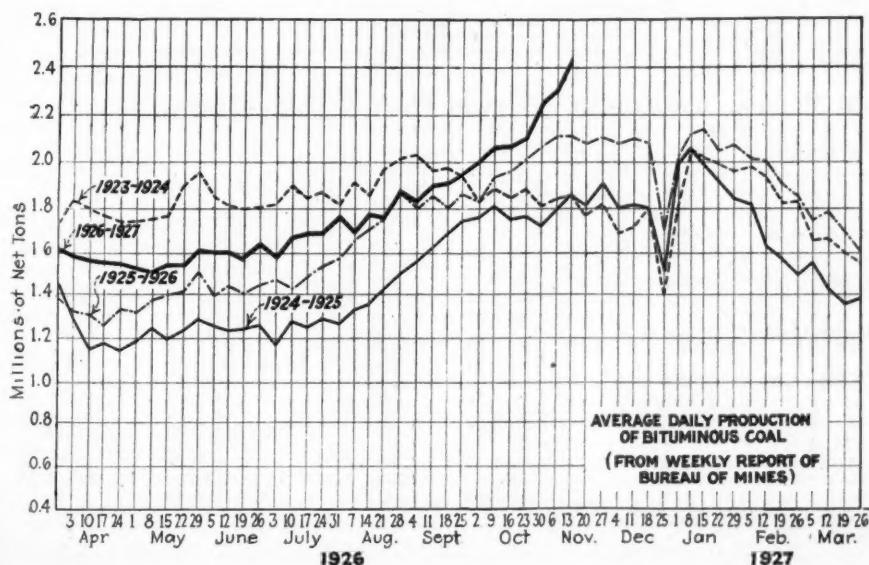
There are, however, other factors which must be taken into consideration in mapping the immediate future of the bituminous trade. On the whole,

consumer buying is on a hand-to-mouth basis. Many purchasers have withdrawn from the market in an attempt to further depress spot quotations. If, as happened a few weeks ago, the quantity of free tonnage available again should be materially reduced, an upturn in prices would result. Transportation, it must be remembered, is none too fluid although there has been a slight increase in surplus car supply. This increase easily might be wiped out by a greater diffusion of equipment.

Anthracite Demand Weakens

From unevenness anthracite demand has passed to weakness in markets close to source of supply. The full effects of this softness have not been felt, however, because some of the more distant communities have increased their buying. New England, for example, is showing more interest and trade at the Head of the Lakes is strong. Moderate production also has helped the situation. During the week ended Nov. 13 output was 1,792,000 net tons. Production last week was interfered with at some operations by flood conditions.

The Connellsville coke market also suffered declines. Careful supervision of production, however, has shortened the losses which might otherwise be incurred. Independent ovens in that section have a problem on their hands in the wage situation. The market for raw coal is fading. Alabama coke ovens are extremely active.



Estimates of Production (Net Tons)

BITUMINOUS

	1925	1926
Oct. 30.....	12,485,000	13,486,000
Nov. 6 (a).....	12,171,000	13,104,000
Nov. 13 (b).....	12,167,000	13,756,000
Daily average.....	2,135,000	2,413,000
Cal. yr. to date (c).....	441,590,000	487,759,000
Daily av. to date.....	1,648,000	1,820,000

ANTHRACITE

Oct. 30.....	19,000	1,805,000
Nov. 6.....	28,000	1,565,000
Nov. 13 (b).....	33,000	1,792,000
Cal. yr. to date (c).....	61,392,000	73,383,000

BEEHIVE COKE

Nov. 6 (a).....	292,000	192,000
Nov. 13 (b).....	295,000	203,000
Cal. yr. to date (c).....	8,738,000	10,241,000

(a) Revised since last report. (b) Subject to revision. (c) Adjusted to equalize number of days in the two years.

Midwestern Domestic Steady

Greater easiness in quotations on screenings from the central Illinois and Fifth Vein Indiana districts marked the extent of the price unsettlement in Illinois and Indiana coals in the Chicago market last week. Eastern high volatiles, however, weakened in sympathy with the declines in trading centers farther east. The tonnage available from Kentucky and West Virginia shippers still is small, but there is no scramble by local buyers for car numbers.

The easier trend to fine coal was a direct result of the strong demand for prepared sizes. "No bills" have been cleaned up and production has been pushed to take care of new orders for the larger sizes. This increase has given some producers a surplus tonnage of screenings. Lower price offerings, however, were confined to the two fields named. In the other districts of

the two states recent gains were maintained.

Scarcity of labor has been a greater check than car shortage upon production in southern Illinois. More complaint with respect to transportation is heard from mines on the Illinois Central R.R. than from operations on other lines. Labor complaints come principally from mines which were closed down most of the summer. Output of both shaft and stripping operations is readily marketed, but there is a feeling that the price situation will divert more business to central Illinois as soon as the first buying rush is over.

Duquoin-Jackson Districts Busy

Mines in the Duquoin and Jackson County districts are averaging four to five days a week. Most of the tonnage is moving at 25 to 50c. under Franklin County quotations. Car shortage reduced possible working time in the Mt. Olive section 16 to 33 per cent. This field continues to enjoy an unusual

Michigan demand. The Standard district is running four to five days a week.

While there is a fair trade in southern Illinois coals in the local St. Louis market, preference is given to the lower priced offerings from other fields. Country trade also leans heavily upon the medium grades. Both local and country steam trade have been improving. There is a substantial movement to the Missouri River cities, Minneapolis, Chicago and, to some extent, Detroit.

The Kentucky situation passed from uncertainty to unsettlement last week and prices tumbled 40c. to \$1.50. The sharpest losses were in slack and mine-run. Indifference of industrial buyers for domestic consumption, cancellation of unfilled orders, sloughing off of export demand and practical cessation of purchases for lake shipment were responsible for the collapse in prices. Many producers have been playing the "high dollar" market so close that the

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

Low-Volatile, Eastern					Midwest				
	Market Quoted	Nov. 23 1925	Nov. 8 1926	Nov. 15 1926	Nov. 22 1926†		Market Quoted	Nov. 23 1925	Nov. 8 1926
Smokeless lump.....	Columbus...	\$5.25	\$5.50	\$5.60	\$5.00@5.50	Franklin, Ill. lump.....	Chicago.....	\$3.75	\$4.00
Smokeless mine run.....	Columbus...	3.10	4.25	4.25	3.50@4.00	Franklin, Ill. mine run.....	Chicago.....	2.60	2.40
Smokeless screenings.....	Columbus...	2.60	2.75	2.75	2.25@2.50	Franklin, Ill. screenings.....	Chicago.....	1.85	1.85
Smokeless lump.....	Chicago.....	5.10	5.50	5.50	5.25@5.75	Central, Ill. lump.....	Chicago.....	3.00	3.50
Smokeless mine run.....	Chicago.....	2.50	3.75	3.75	3.50@4.00	Central, Ill. mine run.....	Chicago.....	2.20	2.20
Smokeless screenings.....	Cincinnati.....	5.25	5.50	5.50	6.00@6.75	Central, Ill. screenings.....	Chicago.....	1.40	1.70
Smokeless mine run.....	Cincinnati.....	2.35	3.75	4.10	3.00@3.50	Ind. 4th Vein lump.....	Chicago.....	3.10	4.00
Smokeless screenings.....	Cincinnati.....	1.85	3.25	3.25	2.75@3.00	Ind. 4th Vein mine run.....	Chicago.....	2.35	2.25
Smokeless mine run.....	Boston.....	5.35	10.00	9.00	7.75@8.50	Ind. 4th Vein screenings.....	Chicago.....	1.80	1.85
Clearfield mine run.....	Boston.....	2.15	3.90	3.10	2.25@2.75	Ind. 5th Vein lump.....	Chicago.....	2.35	3.50
Cambridge mine run.....	Boston.....	2.35	4.25	3.50	2.50@2.85	Ind. 5th Vein mine run.....	Chicago.....	1.95	2.00
Somerset mine run.....	Boston.....	2.25	4.00	3.25	2.35@2.90	Ind. 5th Vein screenings.....	Chicago.....	1.40	1.60
Pool 1 (Navy Standard).....	New York.....	2.85	4.60	4.10	3.50@4.50	Mt. Olive lump.....	St. Louis.....	2.85	2.85
Pool 1 (Navy Standard).....	Philadelphia.....	2.95	4.50	4.35	3.40@3.65	Mt. Olive mine run.....	St. Louis.....	2.00	2.75
Pool 1 (Navy Standard).....	Baltimore.....	2.20	4.60	3.60	3.50@3.75	Mt. Olive screenings.....	St. Louis.....	1.75	1.50
Pool 9 (Super. Low Vol.).....	New York.....	2.30	4.35	3.75	3.00@3.50	Standard lump.....	St. Louis.....	2.40	2.60
Pool 9 (Super. Low Vol.).....	Philadelphia.....	2.30	4.45	4.35	3.15@3.40	Standard mine run.....	St. Louis.....	1.80	2.00
Pool 9 (Super. Low Vol.).....	Baltimore.....	2.00	4.25	3.00	2.75@3.25	Standard screenings.....	St. Louis.....	.85	1.15
Pool 10 (H.Gr. Low Vol.).....	New York.....	2.00	4.00	2.85	2.75@3.25	West Ky. block.....	Louisville.....	2.10	3.75
Pool 10 (H.Gr. Low Vol.).....	Philadelphia.....	2.05	4.35	3.85	2.90@3.10	West Ky. mine run.....	Louisville.....	1.35	2.00
Pool 10 (H.Gr. Low Vol.).....	Baltimore.....	1.90	3.85	2.60	2.50@2.75	West Ky. screenings.....	Louisville.....	.80	1.70
Pool 11 (Low Vol.).....	New York.....	1.70	3.85	2.75	2.50@3.00	West Ky. block.....	Chicago.....	2.35	4.00
Pool 11 (Low Vol.).....	Philadelphia.....	1.90	3.65	3.60	2.70@2.85	West Ky. mine run.....	Chicago.....	1.25	2.25
Pool 11 (Low Vol.).....	Baltimore.....	1.65	3.60	2.35	2.25@2.50				

High-Volatile, Eastern					South and Southwest				
	Market Quoted	Nov. 23 1925	Nov. 8 1926	Nov. 15 1926	Nov. 22 1926†		Market Quoted	Nov. 23 1925	Nov. 8 1926
Pool 54-64 (Gas and St.).....	New York.....	1.55	3.75	2.60	2.25@2.65	Big Seam lump.....	Birmingham.....	2.35	2.60
Pool 54-64 (Gas and St.).....	Philadelphia.....	1.60	4.20	3.35	2.35@2.50	Big Seam mine run.....	Birmingham.....	1.85	2.10
Pool 54-64 (Gas and St.).....	Baltimore.....	1.65	3.75	2.85	2.75@3.00	Big Seam (washed).....	Birmingham.....	2.10	2.35
Pittsburgh se'd gas.....	Pittsburgh.....	2.85	4.35	3.50	3.00@3.25	S. E. Ky. block.....	Chicago.....	3.75	5.50
Pittsburgh gas mine run.....	Pittsburgh.....	2.35	3.85	3.10	2.50@2.75	S. E. Ky. mine run.....	Chicago.....	2.15	3.25
Pittsburgh mine run (St.).....	Pittsburgh.....	2.15	3.50	2.75	2.35@2.50	S. E. Ky. block.....	Louisville.....	3.60	5.60
Pittsburgh slack (Gas).....	Pittsburgh.....	1.45	3.00	2.20	1.90@2.10	S. E. Ky. mine run.....	Louisville.....	1.60	4.25
Kanawha lump.....	Columbus.....	3.10	5.25	5.10	4.25@4.50	S. E. Ky. screenings.....	Louisville.....	1.35	3.25
Kanawha mine run.....	Columbus.....	1.70	4.00	3.85	2.75@3.25	S. E. Ky. block.....	Cincinnati.....	3.35	4.85
Kanawha screenings.....	Columbus.....	1.20	2.10	2.10	2.00@2.25	S. E. Ky. mine run.....	Cincinnati.....	1.55	3.75
W. Va. lump.....	Cincinnati.....	3.25	4.85	5.25	4.50@5.00	S. E. Ky. screenings.....	Cincinnati.....	1.25	3.25
W. Va. gas mine run.....	Cincinnati.....	1.60	3.85	3.25	2.50@3.00	Kansas lump.....	Kansas City.....	5.00	4.60
W. Va. steam mine run.....	Cincinnati.....	1.50	3.85	3.25	2.50@3.00	Kansas mine run.....	Kansas City.....	3.10	3.00
W. Va. screenings.....	Cincinnati.....	1.20	3.25	3.10	2.00@2.25	Kansas screenings.....	Kansas City.....	2.30	2.35
Hooking lump.....	Columbus.....	3.10	5.00	5.00	4.00@4.50				
Hooking mine run.....	Columbus.....	1.65	3.10	2.75	2.00@2.50				
Hooking screenings.....	Columbus.....	1.25	2.25	2.10	1.75@2.00				
Pitta No. 8 lump.....	Cleveland.....	2.55	4.00	3.35	2.50@3.75				
Pitta No. 8 mine run.....	Cleveland.....	1.95	3.10	2.85	2.25@2.35				
Pitta No. 8 screenings.....	Cleveland.....	1.55	2.45	2.25	1.75@1.90				

* Gross tons, f.o.b. vessel, Hampton Roads

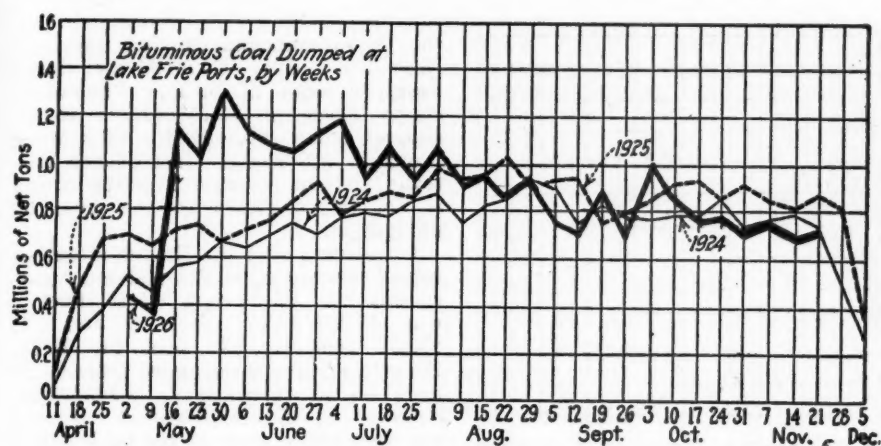
† Advances over previous week shown in heavy type, declines in italics

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

		Nov. 23, 1925		Nov. 15, 1926		Nov. 22, 1926†	
	Market Quoted	Freight Rates	Independent	Company	Independent	Company	Independent
Broken.....	New York.....	\$2.34		\$8.20@8.95		\$8.50@9.25	
Broken.....	Philadelphia.....	2.39				8.50@9.15	
Egg.....	New York.....	2.34		8.65@8.90		8.75@9.25	
Egg.....	Philadelphia.....	2.39				9.00@9.50	
Egg.....	Chicago.....	5.06		8.03@8.25		8.13	
Stove.....	New York.....	2.34		9.15@9.40		9.25@9.50	
Stove.....	Philadelphia.....	2.39				9.75@10.20	
Stove.....	Chicago.....	5.06		8.48@8.80		8.71	
Chestnut.....	New York.....	2.34		8.65@8.95		9.25@9.85	
Chestnut.....	Philadelphia.....	2.39				9.25@10.00	
Chestnut.....	Chicago.....	5.06		8.50@8.75		8.33@8.53	
Pea.....	New York.....	2.22		5.00@6.25		6.00@6.50	
Pea.....	Philadelphia.....	2.14				6.30@6.75	
Pea.....	Chicago.....	4.79		5.50@6.00		6.03	
Buckwheat No. 1.....	New York.....	2.22		2.50@2.75		2.50@3.50	
Buckwheat No. 1.....	Philadelphia.....	2.14		2.50@3.00		2.50@3.00	
Rice.....	New York.....	2.22		2.25		2.00@2.25	
Rice.....	Philadelphia.....	2.14				1.75@2.25	
Barley.....	New York.....	2.22		2.25		1.50@1.75	
Barley.....	Philadelphia.....	2.14				1.50@1.75	
Birdeye.....	New York.....	2.22				2.00	

* Net tons, f.o.b. mines. † Advances over previous week shown in heavy type; declines in italics.

‡ Quotations withdrawn because of strike which started Sept. 1, 1925.



breaks have left them with considerable unsold tonnage.

Eastern Kentucky Prices Off

Eastern Kentucky block toward the close of last week was offered at \$4.50 @ \$5; lump and egg, \$4 @ \$4.50; mine-run, \$2.35 @ \$3, and slack, \$2 @ \$2.50. Western Kentucky declines were lower because price advances had been less than in the case of eastern Kentucky coals. Western Kentucky block, lump and egg could be had at \$3.50 @ \$4.25, with only very choice coal commanding over \$4; nut, \$2.50 @ \$3; mine-run, \$1.25 @ \$2; slack, screenings, \$1.10 @ \$1.50.

Although further weakening seems likely, there are elements which make a reversal of conditions equally possible. Car supply has been short and the shortage is increasing. Superficially the labor situation is easy, but union sympathizers report growing discontent in the western part of the state, where the operators held aloof from the general wage advance movement inaugurated on the first of the month. Severe weather, it is recognized, also would prove a handicap to low prices.

Capacity operation still is the rule at the Head of the Lakes. Orders are flowing in from all classes of consumers and from all parts of the Northwest. There is little free bituminous tonnage on the docks and the difficulties of replacements have led the railroads to insist that their storage stocks shall not be gone into for commercial supplies. Screenings are particularly tight and many docks refuse to accept new orders. What tonnage is available is held firmly at \$5. Anthracite demand has increased sharply and additional orders have been placed with the hard-coal mines.

Twin Cities Trade Easier

The market at the Twin Cities has eased off in sympathy with the trend in surrounding territory, after a temporary show of strength. Steam buyers display a tendency to hold off as much as possible, but this is expected to be short-lived with winter at hand and a blanket of snow already on the ground. Prices are fairly firm. The Milwaukee trade figures, as the close of lake navigation approaches, that there will be just about enough coal on the docks to squeeze through the winter. As demand from the interior has been below normal the recent softening of mine

prices, it is hoped, will be productive of renewed interest on the part of consumers. Prices locally, both wholesale and retail, were unchanged last week.

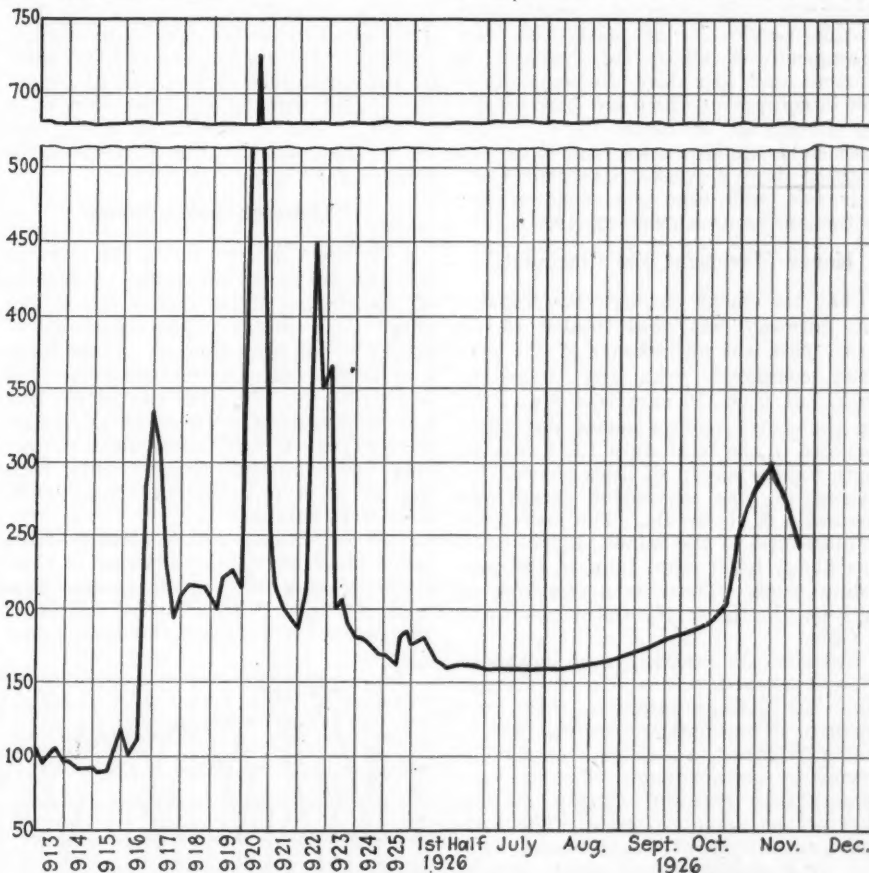
Demand for domestic grades of Southwestern coal in the Kansas City market slowed up somewhat during the second week of the month, with Arkansas semi-anthracite especially slow. There were no accumulations of "no bills," however, as a result of the softer market in domestic sizes. Screenings were firm, and Kansas operators experienced no difficulty in getting the contract basis of \$2.35 on the bulk of their spot offerings.

Colder weather toned up demand for both steam and domestic sizes in Colorado and also brought about some increases in mine prices. Nothing approaching the situation in the East has come to the Intermountain country although Colorado producers look forward to a larger business east of the Missouri River with reduction in shipments into that territory from Illinois and western Kentucky.

Colorado Prices Advanced

Prices on Trinidad lump and nut have been increased from \$3.25 to \$4. Walsenburg-Canon City lump is \$6; nut, \$5; chestnut, \$3. Crested Butte anthracite is \$7 @ \$9, according to size. Colorado slack is \$1.75 @ \$2. Kemmerer-Rock Springs domestic lump is held at \$4.25; nut, \$3.75; slack, \$1.50. Utah mines are working about 50 per cent of the time and the number of "no bills" is increasing. Business on the whole is below seasonal normal.

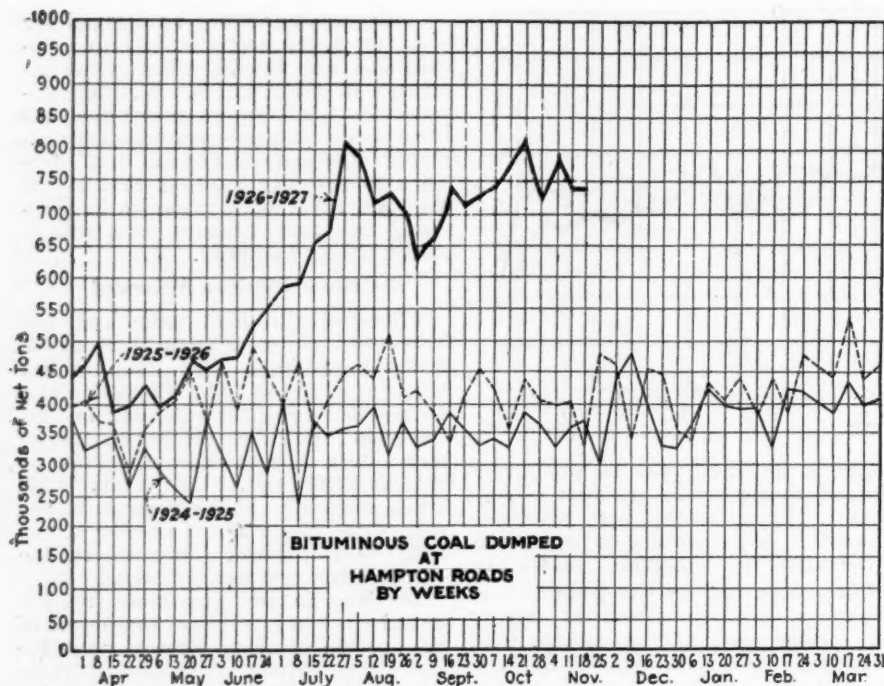
Declines in the Cincinnati market have been less precipitate than some of the apostles of gloom forecast when the end of the British strike seemed imminent. Nut-and-slack, screenings and mine-run have borne the brunt of the losses and even in these cases there is considerable fencing between producers and consumers. Although egg, lump and block have lost some ground, general demand for the prepared sizes of



Coal Age Index of Spot Prices of Bituminous Coal F.O.B. Mines

	1926	1925	1924
Nov. 22	243	275	299
Nov. 15	275	299	285
Nov. 8	299	285	192
Nov. 1	285	192	170
Nov. 23	232	170	
Nov. 24	206		
Index	243	275	299
Weighted average price	\$2.94	\$3.32	\$3.61

This diagram shows the relative, not the actual, price on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States, weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke: 1913-1918," published by the Geological Survey and the War Industries Board.



both low- and high-volatile coal has been strong enough to blunt the force of the drop.

Cincinnati observers believe that the course of the market from now on will hinge on the weather. The closing of navigation will stop the westbound shuttle service from mines on the Chesapeake & Ohio and Norfolk & Western and introduce the same dilution in equipment which has been afflicting Louisville & Nashville districts. Some fields in Kentucky have been cut to three days a week. Car shortages, it is felt, will take the place of the British strike as a price exciter.

Heavy Movement Via Cincinnati

Coal movement through the Cincinnati gateway last week totaled 14,149 cars. This was an increase of 381 cars when compared with the preceding week, but was 310 cars less than during the corresponding period last year. Included in the total were 1,697 cars en route to the lakes; all lines showed increases in lake movement except the Louisville & Nashville. The movement of open-tops to the mines, 12,945 cars, was about 1,000 more than in the preceding week. There is a shortage of cars on the L. & N. and Chesapeake & Ohio.

Reaction in central and southern Ohio weakened prices 50c. to \$1 per ton, but left production rates untouched. The unsettlement was due to milder weather, a sudden stoppage of buying by certain large industrial consumers and renewed apathy on the part of the domestic trade. The last-named development was followed by a run of cancellations of retail orders. Neither buyer nor seller is interested in contracts at the present time. Southern Ohio is operating at approximately 85 per cent of capacity.

The bottom has practically dropped out of the recent flurry in the Cleveland market and prices have fallen almost to the level prevailing before the flare-up. Even at the present range prices are soft, as surplus lake tonnage

and shipments diverted from tidewater have overflowed the market, enabling both steam and domestic consumers to obtain sufficient stocks to play a waiting game for a while. As a result the situation has been completely reversed from a sellers' to a buyers' market. Production in the No. 8 field during the week ended Nov. 13 was 301,000 tons, or approximately 43 per cent of capacity. This was 39,000 tons less than in the preceding week and 8,000 tons more than during the corresponding week a year ago.

Pittsburgh Feels Slump

Like other Eastern fields, the news of the possibility of an early settlement of the British strike had a depressing effect upon prices. Quotations weakened 25c. on three-quarter steam lump and slack, 50c. on three-quarter gas and mine-run, 40c. on gas slack and 15c. on steam mine-run. Large industries appear to have determined to buy only for immediate requirements, hoping by such a policy to force prices down still further.

The reductions which already have taken place have killed interest in Connellsville and lower grade steam offerings, although Connellsville operators who have been selling raw coal claim

they have contracts running well into December. Spot Connellsville, however, is weak at \$2.35. Panhandle steam slack is \$1.75@1.90; three-quarter lump, \$2.75@3. This week probably will see the last of the lake trade and an increase in slack prices is not improbable with the close of navigation.

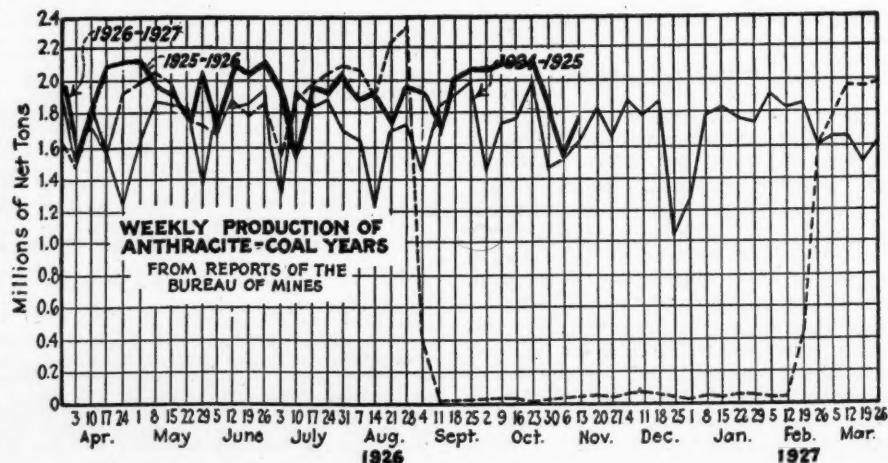
Uneasiness over the British situation forced down central Pennsylvania quotations 25c. to \$1 last week. Pool 1 was \$3.50@3.75; pools 9 and 71, \$3.25; pool 10, \$3; pool 11, \$2.75. Clearfield mine-run dropped from \$2.25 to \$1.85 in three days. Production, however, is well maintained. During the week ended Nov. 13 the field loaded 19,219 cars and loadings for the first two weeks were 4,288 cars ahead of the corresponding period in October.

Buffalo Prices Weaker

Further weakening in Buffalo prices brought down high-volatile quotations 25 to 85c. last week, with predictions freely made that the current week would see still lower prices. Consumers are "bearing" the market at every opportunity. Youghiogheny lump was held at \$3.50@4; gas slack, \$2@2.25; Pittsburgh and No. 8 steam lump, \$2.75@3.25; Allegheny Valley mine-run, \$2.15@2.45. The nominal list on low-volatile still ranges from \$2.25 for Indiana County to \$4 for Pocahontas mine-run, but lump has dropped to \$2.75@5.50.

Toronto reports bituminous receipts ample to take care of the rising industrial demand. The only suggestion of scarcity is in smokeless coal. Mild weather has kept down the distribution of anthracite to the householders. Hard coal at retail is \$16 for stove, \$15.50 for nut and \$12.75 for pea. Three-quarter bituminous lump retails at \$10.50; Pocahontas lump, \$12@13; coke, \$13.

Prices continued to work to lower levels in the New England steam coal market last week. More all-rail coal has been shipped into this territory than canny purchasing agents are ready to snap up. As a result central Pennsylvania prices are wobbling. Some coal can be picked up as low as \$2.25 and shrewd buyers are getting really high-grade fuel for approximately \$3 net at the mines. In certain cases this coal is being used by fuel depots to tide them over until the coastwise situation becomes more settled.



Car Loadings and Supply

	Cars Loaded—		
	All Cars	Coal Cars	
Week ended Nov. 13, 1926.....	1,112,886	242,095	
Week ended Nov. 6, 1926.....	1,137,210	227,574	
Week ended Nov. 14, 1925.....	1,050,758	186,416	
Week ended Nov. 7, 1925.....	1,063,332	189,212	
	Surplus Cars—		Car Shortages—
	All Cars	Coal Cars	All Cars
Nov. 8, 1926..	88,130	12,539	No Report
Oct. 31, 1926..	81,011	12,106	No Report
Nov. 7, 1925..	103,969	37,726	.....

New England Market Easier

Tidewater quotations have eased off 75c. to \$1 per ton. It is understood that vessels from all parts of the world are rushing toward the Virginia piers for cargoes and it is quite possible that the overflow will again spread to the more northern ports and revive congestion at Baltimore and Philadelphia. Offers of Navy Standard at \$9 gross on cars at Boston find few takers, although \$7.75@8.50 is asked f.o.b. Hampton Roads.

The New York bituminous market is spotty. During the forepart of the week past there was a progressive decline, but on Friday and Saturday there was some recovery on receipt of news indicating that quick settlement of the British strike was unlikely. The recovery, however, did not restore prices to the levels of the preceding week. Hand-to-mouth buying is the rule with domestic industrial plants.

Export factors do not expect any sudden stoppage in foreign movement. Overseas shipments, they believe, will continue for several weeks after the British mines as a whole are reopened. Several vessels were loaded in the New York harbor last week and more bottoms are scheduled to take on cargoes this week. B. R. & P. coals are quoted at \$2.65@2.80; Shawmut, \$2.50@2.85; Westmoreland lump, \$3; slack, \$2.25@2.50. Pool quotations appear elsewhere in this section.

Philadelphia Has Tempestuous Time

The soft-coal market had a tempestuous time during the past week at Philadelphia. Domestic steam buyers

dropped out of the market when the British strike reports indicated a speedy settlement, but were forced to place orders later. The cancellations which followed the first strike settlement reports, however, left the situation much upset and gave buyers a chance to pick up a little distress tonnage. Actual loadings at the piers declined slightly, but there is a congestion of bottoms awaiting their turn to load.

Developments in the British strike negotiations the forepart of last week spread gloom in the Baltimore bituminous market. Prices, which had begun to slide the preceding week, were still softer, with declines the sharpest in the gas coals. Nevertheless, even before the latest hitch in the British negotiations was known, the more optimistic in the trade forecast a substantial overseas movement well into January. Total dumpings this year already exceed the record made in 1920 and November clearances continue at a heavy rate.

Buying is still very active in the Birmingham district, but advances in prices are now limited to the grades in which the supply is unusually short. Large industrial consumers and railroads have little reserve stock and current consumption is heavy. The Seaboard Air Line increased its tonnage allotment to this district last week because it could not get enough coal from other fields. Bunker and export movement through the Gulf ports is steady although new inquiries are lighter. Black Creek washed has advanced to \$3.60@3.80.

Domestic Coal Sold Up

Most of the desirable domestic coal has been sold ahead to the end of the year. There is a stiff demand for foundry coke at \$6. Egg at \$5.25, stove at \$4.75 and nut at \$4.25 are selling well. Ovens look for a heavier movement to Michigan points if the new rate adjustment proposed by the Louisville & Nashville is allowed by the Interstate Commerce Commission.

Anthracite is marking time at New York. There are plenty of orders, but dealers are blocked with coal and unable to take care of shipments. This

delay hits the independents more than the company shipments and has caused further reductions in independent prices. Stove and nut are running a neck-and-neck race for leadership in demand. Egg is very draggy and there has been no improvement in pea. The steam coals are easier, with rice showing the greatest strength.

Philadelphia local and line trade in anthracite has dropped off sharply and it is only demand from New England and other markets distant from the mines which is keeping up production. Philadelphia retail deliveries are almost on a midsummer basis. Stove alone retains real popularity. Nut is easier and pea is becoming a drug on the market. Unlike New York, however, the steam trade is in good shape. Buckwheat shows a slight improvement and rice and barley offerings are readily absorbed.

Mild Weather Hurts Anthracite

At Baltimore mild weather has held down buying and the trade is without distinguishing features. The mercury also has been responsible for slow sales in the Buffalo domestic market. Lake dumpings, however, have picked up sharply. During the week ended Nov. 18 the Buffalo piers loaded 90,100 net tons of hard coal, of which 40,800 tons were cleared for Milwaukee, 38,500 tons for Duluth and Superior, 6,000 tons for Manitowoc, 1,800 tons for Sheboygan and 3,000 tons for the Canadian Sault.

Spot buying of Connellsville coke has been light. Buyers for household consumption are holding off for lower prices and quotations on heating coke have dropped from \$4.25 or better to \$3.50. Blast furnaces are purchasing practically no spot tonnage. Foundries, when they buy on the spot market, are interested only in car numbers. Furnace coke has weakened to \$4.50@5; foundry coke has declined to \$5.50@6.

Beehive coke production in the Connellsville and Lower Connellsville region during the week ended Nov. 13 was 140,940 tons, according to the Connellsville Courier. Furnace-oven output was 68,300 tons, a decrease of 100 tons when compared with the preceding week. Merchant-oven production was 72,640 tons, an increase of 1,540 tons.

Coal Produced in Alabama in 1925*

(Exclusive of Product of Wagon Mines)

County	Loaded at Mines for Shipment	Net Tons		Made into Coke at Mines	Total Quantity	Value		Number of Employees					Average Number Days Worked	Average Tons per Man per Day
		Sold to Local Trade and Used by Employees	Used at Mines for Steam and Heat			Total	Average per Ton	Miners, Loaders and Shot-firers	Haulage and Track	All Others	Surface	Total		
Bibb.....	1,157,709	6,915	23,566	.....	1,188,190	\$3,005,000	\$2.53	1,135	210	254	290	1,889	224	2.81
Blount.....	258,934	4,199	7,720	.....	270,853	599,000	2.21	333	42	43	79	497	217	2.51
Etowah.....	124,477	1,284	2,231	.....	127,992	321,000	2.51	158	19	22	49	248	272	1.89
Fayette and Marion.....	150,278	1,868	600	.....	152,746	460,000	3.01	200	27	19	55	301	172	2.95
Jefferson.....	9,308,254	130,304	169,927	93,700	9,702,185	20,664,000	2.13	7,054	1,498	2,112	1,876	12,540	268	2.88
St. Clair.....	815,327	4,489	31,743	.....	851,559	1,876,000	2.20	508	110	145	139	902	276	3.42
Shelby.....	731,554	8,633	15,101	.....	755,288	2,343,000	3.10	863	152	182	261	1,458	221	2.34
Tuscaloosa.....	959,690	26,214	3,972	4,467	996,343	2,098,000	2.11	780	150	185	222	1,337	259	2.88
Walker.....	5,535,612	365,685	41,373	.....	5,942,670	11,040,000	1.86	4,524	1,038	824	1,477	7,863	219	3.44
Winston.....	15,069	900	600	.....	16,569	36,000	2.17	41	5	6	10	62	127	1.86
	19,056,904	550,491	298,833	98,167	20,004,395	\$42,442,000	\$2.12	15,596	3,251	3,792	4,458	27,097	246	3.00

*The figures relate only to active mines of commercial size that produced coal in 1925. The number of such mines in Alabama was 239 in 1925; 238 in 1924; and 288 in 1923.

Methods of mining in 1925: The tonnage undercut by hand was 2,432,110; shot off the solid, 6,559,783; cut by machines, 10,594,391; mined by stripping, 403,682; not specified, 14,429.

Size classes of commercial mines in 1925: There were 4 mines in Class 1-A

(500,000 tons and over), producing 15.9 per cent of the tonnage; 19 in Class 1-B (200,000 to 500,000 tons), with 27.6 per cent; 40 in Class 2 (100,000 to 200,000 tons), with 28.3 per cent; 46 in Class 3 (50,000 to 100,000 tons), with 17.1 per cent; 73 in Class 4 (10,000 to 50,000 tons), with 10.1 per cent, and 57 in Class 5 (less than 10,000 tons), producing 1.0 per cent.

Compiled by U. S. Bureau of Mines.

Foreign Market And Export News

Franco-Belgian Coal Markets Mark Time

Paris, France, Nov. 5.—No improvement in supplies was noticeable in the French market the opening of the month. On the contrary, flaming coals have become extremely scarce. Domestic coals probably are the easiest because buying has subsided with rising temperatures.

Advances still are the order of the day. A government request that French mines reserve 10 per cent of their production, in addition to usual deliveries, for public services, was followed by the announcement that Lorraine prices would be increased 15@20 fr. The Nord and Pas-de-Calais mines have advanced ovoids 35 fr. Transportation costs, too, are rising.

During the first twenty-three days of October the O. H. S. received 152,800 metric tons of coal and 82,900 tons of coke from the Ruhr. The O. H. S. has established new prices for November which show advances of 10 to 22 fr. over October figures. Considerable irritation is expressed over the falling off in receipts of German coke.

French mines produced 4,299,745 metric tons of coal and 92,378 tons of lignite in September. The August figures were 4,279,583 and 85,284 tons, respectively.

From Belgium come reports that the government may take further measures to protect home supplies and increase production by asking the miners to work longer hours. Prices on all grades of fuel are high.

Export Movement Strong At American Ports

Bituminous exports from Philadelphia, Baltimore and Norfolk during the week ended Nov. 13 totaled 617,368 gross tons. Philadelphia dumped 124,035 tons, as compared with 100,439 tons the week preceding; Norfolk exports increased from 226,014 to 315,998 tons, but Baltimore shipments dropped from 267,974 to 177,335 tons.

Export Clearances, Week Ended Nov. 18

FROM HAMPTON ROADS	
For United Kingdom:	
Dan. Str. Hagno.....	4,723
Span. Str. Agire Mendi.....	7,558
Ital. Str. Eliss Campanella.....	2,749
Br. Str. Clan Ogilvy.....	6,969
Du. Str. Admiral de Reuter.....	7,026
Br. Str. Falls City.....	6,643
Ital. Str. Conte Stefano Tisza.....	4,008
Span. Str. Igotz Mendi.....	5,675
Br. Str. Rupperra.....	7,387
Br. Str. Grellisle.....	3,009
Br. Str. Hartford.....	13,388
Br. Str. Argalia.....	7,118
Span. Str. Consuelo.....	5,169
Span. Str. Maria Victoria.....	4,444
Br. Str. Cape St. Lucia.....	3,269
Br. Str. Blairdevon.....	5,009
Br. Str. Glenardle.....	6,263
Span. Str. Orbe.....	4,440
Grk. Str. Georgios M.....	6,434

Du. Str. Hector.....	4,139
Br. Str. Barrington Court.....	7,073
Br. Str. Ramsay.....	7,015
Br. Str. Gresile.....	3,700
Span. Str. Abodi Mendi.....	7,853
For Jamaica:	
Nor. Str. Haraldshaug, for Kingston.....	2,637
Swed. Str. Greta, for Kingston.....	2,801
For England:	
Br. Str. Rockcliffe, for Tyne Dock.....	5,527
Br. Str. Trecarrell, for London.....	6,586
Br. Str. Monica Seed, for London.....	3,127
For Danish West Indies:	
Amer. Schr. Brina P. Pendleton, for Curacao.....	2,237
For Uruguay:	
Nor. Str. Seugundo, for Montevideo.....	4,015
For Brazil:	
Grk. Str. Ithaki, for Pernambuco.....	5,487
Br. Str. Orelana, for Santos.....	6,068
Br. Str. Busanda, for Rio de Janeiro.....	5,014
Br. Str. Kalimba, for Rio de Janeiro.....	6,610
For Gibraltar:	
Grk. Str. Eugenia.....	4,082
Du. Str. Veedijk.....	2,365
For France:	
Dan. Str. Nordfarer, for Havre.....	5,059
For Argentina:	
Nor. Msp. Lidvard, for Buenos Aires.....	4,129
Belg. Str. Roi Leopold, for Buenos Aires.....	5,153
Noor. Str. Henrik Ibsen, for Buenos Aires.....	5,708
For Tenerife:	
Ital. Str. Tagliamento, for Las Palmas.....	7,003
For French West Indies:	
Amer. Str. Magore, for Fort de France.....	5,692
For Venezuela:	
Br. Schr. Avon Queen, for Puerto Cabello.....	1,549
For Azores:	
Dan. Str. Hans Maersk, for Fayal.....	2,879
For Colombia:	
Amer. Schr. Sally Persis, for Puerto Rico.....	1,496
For Egypt:	
Br. Str. Parrish City, for Port Said.....	8,486
For Italy:	
Ital. Str. Nippon, for Trieste.....	8,211

FROM BALTIMORE

For England (for Queenstown for orders unless otherwise specified):	
Br. Str. Sheafwater, for London.....	3,414
Ital. Str. Flanona.....	7,255
Dan. Str. Birte Jensen.....	5,814
Br. Str. Andreas.....	8,979
Span. Str. Guadalquivir.....	5,616
Span. Str. Atayala.....	4,836
Dut. Str. Ulysses, for Lands End.....	3,803
Ital. Str. Antartico, for Lands End.....	9,305
Span. Str. Artea Mendi.....	4,713
Br. Str. Arlington Court, for Manchester.....	7,142
Br. Str. Missouri, for Lands End.....	5,451
Br. Str. Hollinside.....	5,552
Br. Str. Reading.....	6,199
Gr. Str. Rhode Island.....	7,369
Br. Str. Rathlin Head.....	7,722
Br. Str. Lady Astley, for Lands End.....	4,460
Span. Str. Unbe Mendi.....	5,945
Span. Str. Begona No. 4.....	5,016
Br. Str. Innerton.....	6,874
Br. Str. Eurybates.....	7,320
Br. Str. Kodrus.....	5,382
Br. Str. Sheaf Field, for London.....	3,464
Br. Str. Sunwood, for Lands End.....	4,114
Ger. Str. Real, for Lands End.....	4,569
Br. Str. King Robert.....	7,806
Br. Str. Yorkminster.....	5,550
Swed. Str. Milos, for Lands End.....	4,435
Br. Str. Delblair, for Beckton.....	7,321
Grk. Str. Issidora.....	6,114
Span. Str. Arriluze.....	2,596
Ital. Str. Faleria, for Lands End.....	7,600
Br. Str. Firby.....	7,204
Br. Str. Clan Skene, for Liverpool.....	6,134
Nor. Str. Beljeanne.....	9,730
J.-S. Str. Nikola Mihanovic.....	7,280
Br. Str. Errington Court.....	7,045
Br. Str. Lavington Court.....	9,863
Br. Str. Teesbridge.....	5,312
Belg. Str. Galdonier, for Gibraltar for orders.....	6,920
Ital. Str. Valdiere.....	6,502
Br. Str. Cape Camorin.....	7,045
Br. Str. Maindy Manor, for Dunkirk.....	6,019
Br. Str. Heathside.....	4,441
For Wales:	
Ital. Str. Fedora, for Cardiff.....	5,040
For Ireland:	
Br. Str. Eastbury, for Cork.....	4,013
Dut. Str. Witte Zee, for Belfast.....	3,614

Br. Str. Roseden, for Cork.....	6,207
Dut. Str. Asphard, for Dublin.....	5,013
Br. Str. Lord Downshire, for Dublin.....	5,887
Br. Str. Benthaw, for Dublin.....	6,742
Nor. Str. Olaf Kyree, for Belfast.....	4,032
For Italy:	
Ital. Str. Auranis, for Savonia.....	5,641
Ital. Str. Andrea, for Genoa.....	5,641
Nor. Str. Hallgrim, for Savonia.....	9,212
Ital. Str. Pietro Campanella, for Civita Vecchia.....	7,361
For Canary Islands:	
Am. Str. Carolinas, for Las Palmas.....	2,819
Span. Str. Mar Caribe, for Las Palmas.....	5,041
For Norway:	
Am. Str. Juvigny, for Lande Pyfylke.....	3,106
Nor. Str. Gro, for Oslo.....	5,768
For Argentina:	
Br. Str. Nestlea, for La Plata.....	6,216
Br. Str. Glensanda, for Bahia.....	7,279
For Egypt:	
Br. Str. Cheswick, for Alexandria.....	4,697
For Morocco:	
Br. Str. Pentirion, for Monaco.....	3,724
For Algeria:	
Br. Str. Thornbury, for Oran.....	2,715
For Brazil:	
Swed. Str. Bore, for Rio de Janeiro.....	4,437
For France:	
Ital. Str. Pollenzo, for Havre.....	9,478
For Denmark:	
Nor. Str. Cederic, for Copenhagen.....	5,384
For Portugal:	
Br. Str. Withington, for Lisbon.....	4,275
For Cuba:	
Br. Str. Berwindmoor, for Havana.....	9,691
Am. Str. Santore, for Diaquiri.....	3,009

FROM PHILADELPHIA

For United Kingdom:	
Ger. Str. Tuckuman, Swed. Str. Sydland, Ital. Str. Fillippo Artellim, Br. Str. Trader, Mississippi, Medomsley, Alness, Antonio Tropovitch and Daytonio, Span. Str. Jata Mendi, Magari and Marta.....	—
For Gibraltar:	
Dan. Str. Jose.....	—
For Sweden:	
Swed. Str. Liguria, for Oslo.....	—
For France:	
Br. Str. Sudbury, for Marseilles.....	—
For Denmark:	
Nor. Str. Modig.....	—
For Italy:	
Br. Str. Madrisa City, for Genoa.....	—
Jap. Str. Glasgow Maru, for Genoa.....	—
For Africa:	
Fr. Str. Medjerda, for Dakar.....	—
Fr. Str. Terenzo, for Algeria.....	—
For Canada:	
Nor. Str. Laly, for Quebec.....	—
For Brazil:	
Br. Str. W. I. Radcliffe, for Santos.....	—
Br. Str. Pengreep, for Rio Janeiro.....	—
For Holland:	
Ital. Str. Valentino Coda, for Rotterdam.....	—
For Norway:	
Nor. Str. Landvaard, for Drammen.....	—
Nor. Str. Chris. Michelsen, for Tofts.....	—

Hampton Roads Coal Dumpings*

	(In Gross Tons)	Nov. 11	Nov. 18
N. & W. Piers, Lamberts Pt.:			
Tons dumped for week.....	256,125	284,531	
Virginian Piers, Sewalls Pt.:			
Tons dumped for week.....	166,774	153,017	
C. & O. Piers, Newport News:			
Tons dumped for week.....	236,358	221,628	

*Data on cars on hand, tonnage on hand and tonnage waiting withheld due to shippers' protest.

Pier and Bunker Prices, Gross Tons

PIERS		Nov. 11	Nov. 18†
Pool 1, New York....	\$7.00@	\$7.25	\$6.75@
Pool 9, New York....	6.50@	6.75	6.00@
Pool 10, New York....	6.20@	6.55	5.75@
Pool 11, New York....	6.00@	6.35	5.40@
Pool 9, Philadelphia....	7.20@	7.40	6.70@
Pool 10, Philadelphia....	7.05@	7.25	6.55@
Pool 11, Philadelphia....	6.65@	6.90	6.15@
Pool 1, Hamp. Roads....	8.50@	8.75	7.50@
Pool 2, Hamp. Roads....	8.00@	8.25	7.00@
Pool 3, Hamp. Roads....	7.00@	7.50	6.00@
Pools 5-6-7, Hamp. Rds.	9.00		6.50@
BUNKERS		Nov. 11	Nov. 18†
Pool 1, New York....	\$7.25@	\$7.50	\$7.00@
Pool 9, New York....	6.75@	7.00	6.25@
Pool 10, New York....	6.45@	6.60	6.00@
Pool 11, New York....	6.25@	6.60	5.65@
Pool 9, Philadelphia....	7.45@	7.65	7.00@
Pool 10, Philadelphia....	7.25@	7.50	6.80@
Pool 11, Philadelphia....	6.90@	7.20	6.40@
Pool 1, Hamp. Roads....	8.50@	8.75	7.50@
Pool 2, Hamp. Roads....	8.00@	8.25	7.25
Pools 5-6-7, Hamp. Rds.	9.00		6.75

†Advances over previous week shown in heavy type; declines in italics.

Coming Meetings

American Society of Mechanical Engineers. Annual meeting, Engineering Societies Building, 29 W. 39th St., New York City, Dec. 6-9. Secretary, Calvin W. Rice, 29 W. 39th St., New York City.

Fifth National Exposition of Power and Mechanical Engineering, Dec. 6-11, at Grand Central Palace, New York City. Manager, Fred W. Payne, Grand Central Palace, New York City.

American Mining Congress. Annual meeting, Washington, D. C., Dec. 7-10, Hotel Mayflower. Secretary, J. F. Callbreath, Munsey Bldg., Washington, D. C.

Coal Mining Institute of America. Annual meeting, Chamber of Commerce, Pittsburgh, Pa., Dec. 8, 9 and 10. Secretary, H. D. Mason, Jr., Box 604, Ebensburg, Pa.

Smokeless Coal Operators' Association of West Virginia. Annual meeting Dec. 9, at Washington, D. C. (tentative). Secretary, E. J. McVann, Insurance Bldg., Washington, D. C.

Coal Operators' Association of the Thick Vein Freeport Seam of Pennsylvania. Annual meeting Dec. 14, at Pittsburgh, Pa. Secretary, C. W. Gibbs, Pittsburgh, Pa.

American Society of Civil Engineers. Annual meeting, Jan. 19-21, 1927, at Engineering Societies Bldg., New York City. Secretary, George T. Seabury, 29 West 39th St., New York City.

Philadelphia Coal Club. Annual meeting, Jan. 27, 1927, at the Bellevue-Stratford Hotel, Philadelphia, Pa. Secretary, Charles K. Scull, Philadelphia, Pa.

American Institute of Mining and Metallurgical Engineers. Annual meeting, Feb. 14-17, 1927, Engineering Societies Bldg., New York City. Secretary, H. Foster Bain, 29 West 39th St., New York City.

New Companies

The Benson Coal Co., of Columbus, Ohio, has been chartered with a capital of \$10,000 to mine and sell coal, coke and other fuels. The incorporators are Ralph E. Martin, Carl Tresemer, Irene A. Wells, Henry G. Binns and Ralph E. Weaver.

The Modern Coal Co., of Shawnee, Ohio, has been chartered with a capital of \$10,000 to mine coal in the Hocking Valley field. H. H. Orr, Edward B. Pierce, Donald G. Power, John W. Bricker and G. H. Sandburg are the incorporators.

Articles of incorporation have been filed by the **Harlan County Coal Co.,** Covington, Ky., capital \$500,000, Harry G. Beebe, Leo F. Ryall and Cecil A. Runyan, all of Kalamazoo, Mich., are the incorporators.

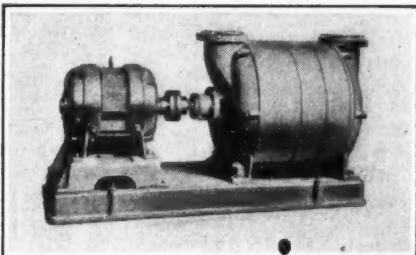
The McCoy-Chain Coal Co., Cleveland, Ohio, has been chartered with a capital of \$10,000 to mine and sell coal. The incorporators are John H. Kapp, Helen Kappler, Mariam Gray, Ruth Henn and I. J. Warner.

New Equipment

Removes Dust Explosion Hazards by Vacuum

A powerful and rapid dirt-removal system that picks up, conveys and collects dust in one operation has been designed and placed in operation by the Allen and Billmyre Co., Inc., New York, N. Y. This system, electrically operated, is known as the "Tabco," and performs its work without spreading or raising any dust into the atmosphere.

In operation it is simple, for it acts similar to the ordinary household vacuum cleaner, differing only in that it is extremely powerful, and has an enormous capacity. Multistage centrifugal blowers and exhausters, are used in this device, and are made in a wide range



Removes Dust without "Raising" It

The exhauster shown in the illustration is driven by a 40-hp. motor. It was installed by the United Electric Light and Power Co., New York, N. Y.

of sizes and capacities for delivering air or gas at different pressures. They are built in units of $\frac{1}{2}$ to 50 hp.

Because no dust is raised during its operations the manufacturers claim that this system is particularly adapted to use in coal pulverizing plants and other places where the accumulations of dust constitute a serious explosion hazard. It can also be used in central power stations, the dust being easily and quickly removed from the tops of boilers and other structures. This dust removing system meets with the approval of the National Fire Protection Association for minimizing dust explosion hazards.

Filtering Air in a New Way Eliminates Difficulties

A new air filter that is said to be revolutionary in design and to eliminate many difficulties heretofore found in air filters, has been announced by the American Blower Co., of Detroit, Mich. By means of this new filter, which is of dry plate design with hair-like tentacles for the arresting and retention of dust and dirt, dust-laden air is divided into a series of small jets, which strike the flat filament-coated surface of the plates; dust and soot are projected against the filament, seized, and retained. The air, changing its direction and rebounding from this surface, flows through to the next plate

and is carried through ten successive dust-removal operations of this type. As dust builds up on these flat surfaces, each preceding layer acts as a retentive member, the dust itself being the principal dust-arresting and retaining factor for the ensuing particles of dust and dirt. In this way, the use of adhesives is avoided and the maximum load of a cleaner or filter is multiplied many times.

The outstanding advantages of this type of air filter are said to be that it is impossible to clog the filter, that it does not require oil or other adhesives which have to be changed from time to time, that it has a constant effect and constant efficiency, and that dust builds upon dust and does not get in the line of air flow.

Self-Lubricating, Non-Metallic Gear Material Now Available

In its announcement of a new gear material the Fibroc Insulation Co., Valparaiso, Ind., states that gear teeth made from it have a life approximately 35 per cent greater than that of ordinary gear teeth.

This material is known as Fibroc GR and is a bakelite product which is impregnated with graphite. The manufacturer claims that it can be cut and formed into gears the same as other bakelite materials and has the quality of noiseless operation which is characteristic of non-metallic gears.

New Relay Designed for Wide Range of Service

Superseding its old relays which were known as the Imperial type, the Roller-Smith Co., 233 Broadway, New York, announces a new line of direct-current relays, type SR.

On these new instruments the scales are longer and, according to the manufacturer the accuracy is greater while the torque has been increased several times. The new $7\frac{1}{2}$ -in. round-pattern style of case has been adopted to match the company's type SA and type SD lines of indicating instruments.

These relays use the regular instrument mechanisms for operating the self-contained, circuit-opening or closing switch. The instrument has a platinum spring contact attached to its pointer, which contact co-operates with a similar one carried by an externally-adjusted pilot needle. This latter is set by means of a slotted-head button projecting from the front of the relay case. The circuit established on the engagement of the contacts energizes an electro magnet which operates the switch and effects external circuit change for which the relay is designed.

These relays are available in the following forms: Reverse current, overload, underload, closed circuit underload, overvoltage and undervoltage.

New Armstrong Trap of Large Capacity

To meet the demand for a trap that would handle sudden large inflows of condensate, the Armstrong Machine Works, Three Rivers, Mich., has brought out the compound valve trap illustrated.

The new trap, according to *Power*, incorporates the inverted submerged bucket principle used on the line made for some years by this company and in addition a piston-actuated valve in the base of the trap which allows large quantities of water to be discharged rapidly.

The operation of the trap is as follows: Assume that the upper part of the trap, with the exception of the inverted bucket, is full of water. The bucket, full of steam, is afloat, holding the valve *A* closed. As long as the steam flows into the trap and up through tube *B*, replacing what condenses, the bucket continues afloat and valve *A* remains closed.

Water accumulates in the base or chamber *D* until the bottom of tube *B* is submerged and further flow of steam into the bucket *C* is stopped. Steam in the bucket condenses; the bucket loses its buoyancy and sinks; and, as it sinks the valve *A* is drawn open. The discharge which then takes place through valve *A* and pipe *E* builds up a pressure behind the piston *F* which moves away, opening valve *G*. The opening of this valve releases water from the inlet and base of the trap, and direct discharge takes place through valve *G*, as shown by the arrows.

When the discharge lowers the level in the base until the bottom of the tube *B* is uncovered, steam again flows into the bucket and buoys it up. As the bucket rises, it closes the valve *A*, stopping the discharge through the pipe *E*. When valve *A* closes, the

pressure in the cylinder and against the piston *F* is dissipated through the vent *H* in the piston *F*. When this takes place, the flow of water through the valve *C*, together with the spring *J* causes the valve *G* to close and the cycle of operation is completed. The trap continues to discharge as long as water comes to it, and if the flow is small, the water may be handled entirely through the valve *A* and vent *H*. The cap, body and base castings are of cast iron, and the upper valve *A* and the piston valve parts are of heat-treated chrome steel.

New Meter Will Read Volts or Amperes, Either A.C. or D.C.

With the increasing interest in the more efficient use of current both alternating and direct, the mine electrician is more and more coming to the use of testing instruments. The Martindale Electric Co., Cleveland, O., has announced a new combination ammeter and voltmeter that can be used for either alternating or direct current. This instrument is known as the Martindale Universal Portable Ammeter and Voltmeter.

It consists of a separate voltmeter and ammeter mounted together in the same case, in which space is also provided for five ammeter shunts, rated at 5, 10, 50, 100 and 300 amp. respectively. The voltmeter has an internal resistance of such value that the full scale may be 75, 150, 300 or 600 volts, depending upon which binding posts are used. This instrument is so constructed that either meter may be removed from the case and used separately if so desired.

Recent Patents

Mine Car Connector; 1,599,677. John F. O'Connor, Chicago, Ill. Sept. 14, 1926. Filed Sept. 28, 1923; serial No. 665,312.

Loading Machine, 1,599,819. Joseph F. Joy, Franklin, Pa. Sept. 14, 1926. Filed Jan. 24, 1924; serial No. 688,184.

Loading Machine; 1,595,565. Norton A. Newdrick, Columbus, Ohio, assignor to the Coloder Co., Columbus, Ohio. Aug. 10, 1926. Filed Dec. 11, 1922; serial No. 606,234.

Conveyor; 1,595,566. Norton A. Newdrick, Columbus, Ohio, assignor to the Coloder Co., Columbus, Ohio. Aug. 10, 1926. Filed Dec. 11, 1922; serial No. 606,234.

Coke-Handling Apparatus; 1,595,594. Joseph Becker, Pittsburgh, Pa., assignor to the Koppers Co., Pittsburgh, Pa. Aug. 10, 1926. Original application filed April 23, 1920; serial No. 376,126. Divided and this application filed April 18, 1922; serial No. 555,149.

Miner's Squib Holder and Insert; 1,595,663. Isaac T. Jenkins, Tunkhannock, Pa. Aug. 10, 1926. Filed Dec. 16, 1925; serial No. 75,748.

Differential Coal Flotation; 1,595,731. J. V. Quigley, Alameda, Calif., assignor to Minerals Separation North American Corp., New York City. Aug. 10, 1926. Filed May 24, 1922; serial No. 563,215.

Trade Literature

Cameron Single - Stage Double - Suction Volute Centrifugal Pumps. Ingersoll-Rand Co., New York City. Form No. 7059. Second edition. Pp. 23; 8½x11 in.; illustrated. Describes classes LV, FV and HV, suitable for direct connection to alternating or direct-current motor, steam turbine, gasoline engine, or for belt drive.

Drill Sharpener. Sullivan Machinery Co., Chicago, Ill. Bulletin 72-J. Pp. 31; 6x9 in.; illustrated. Describes the latest type of Sullivan all-hammer compressed-air drill sharpener for heavy duty in mines and quarries. Various improvements, including a new design of frame, retracting hollow steel punch and new gauging devices, are mentioned.

Tree Wire. The Okonite Co., Passaic, N. J. Pp. 21; 7x10 in.; illustrated. Describes the use of this wire to overcome the serious troubles experienced with ordinary weatherproof wire when electric-light and power lines must be placed through trees.

Everlasting Exhaust Fan. The Macleod Co., Cincinnati, Ohio, Bulletin No. 315. Four-page folder illustrating and describing the construction, operation, etc., of this fan.

Publications Received

Petroleum in 1924, by G. B. Richardson and A. B. Coons. Bureau of Mines, Washington, D. C. Pp. 73; 6x9 in.; illustrated.

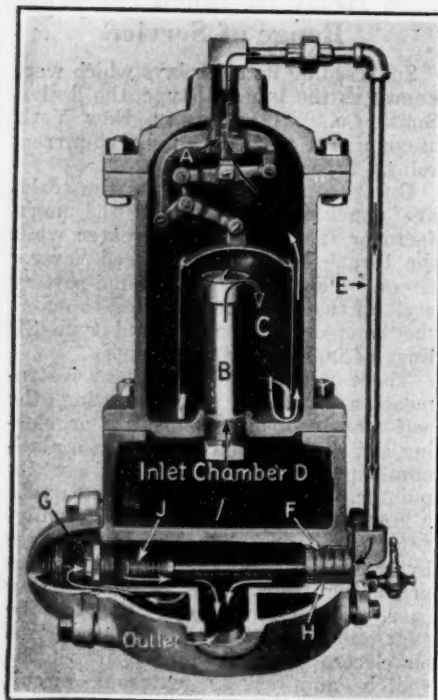
Hours and Earnings in Anthracite and Bituminous Coal Mining, 1922 and 1924. No. 416. Bureau of Labor Statistics, Washington, D. C. Pp. 92; 6x9 in.; tables.

Our Coal Problem, by Samuel S. Wyer, Ohio Chamber of Commerce, Columbus, Ohio. Pp. 28; 6x9 in.; illustrated. Salient features of the U. S. Coal Commission's Report.

Pyritic Oxidation in Relation to the Spontaneous Combustion of Coal, by H. Macpherson, N. Simpkin and S. V. Wild. Safety in Mines Research Board. Paper No. 26. Price, 1s. net. H. M. Stationery Office, Adastral House, Kingsway, W.C.2, London, England. Pp. 15; 6x9 in.; illustrated. An account of an examination of the various types of pyrites occurring in coal, with a view to determining their composition.

1926 Year Book of The Merchants' Association of New York. Woolworth Bldg., New York City. Pp. 332; 6½x9½ in. Contains reports of the different bureaus, with alphabetical and classified lists of the members.

The Spontaneous Combustion of Coal: The Most Readily Oxidizable Constituents of Coal, by W. Francis and R. V. Wheeler. Safety in Mines Research Board, Paper No. 28. H. M. Stationery Office, Adastral House, Kingsway, W.C.2, London, England. Price, 1s. 6d. net. Pp. 51; 6x9 in.; illustrated. Gives an account of recent work designed to determine which constituents of the coal conglomerate are most readily attacked by oxygen.



Meets Sudden Large Inflows

The piston operated valve gives this trap adequate capacity, enabling it to discharge large quantities of water rapidly.